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- Tubular Products' Physical Properties
- Welding Hardenable Steels
- Simplified Production Scheduling

STEEL

The Magazine of Metalworking and Metalproducing

VOL 121, NO. 12 SEPTEMBER 22, 1947

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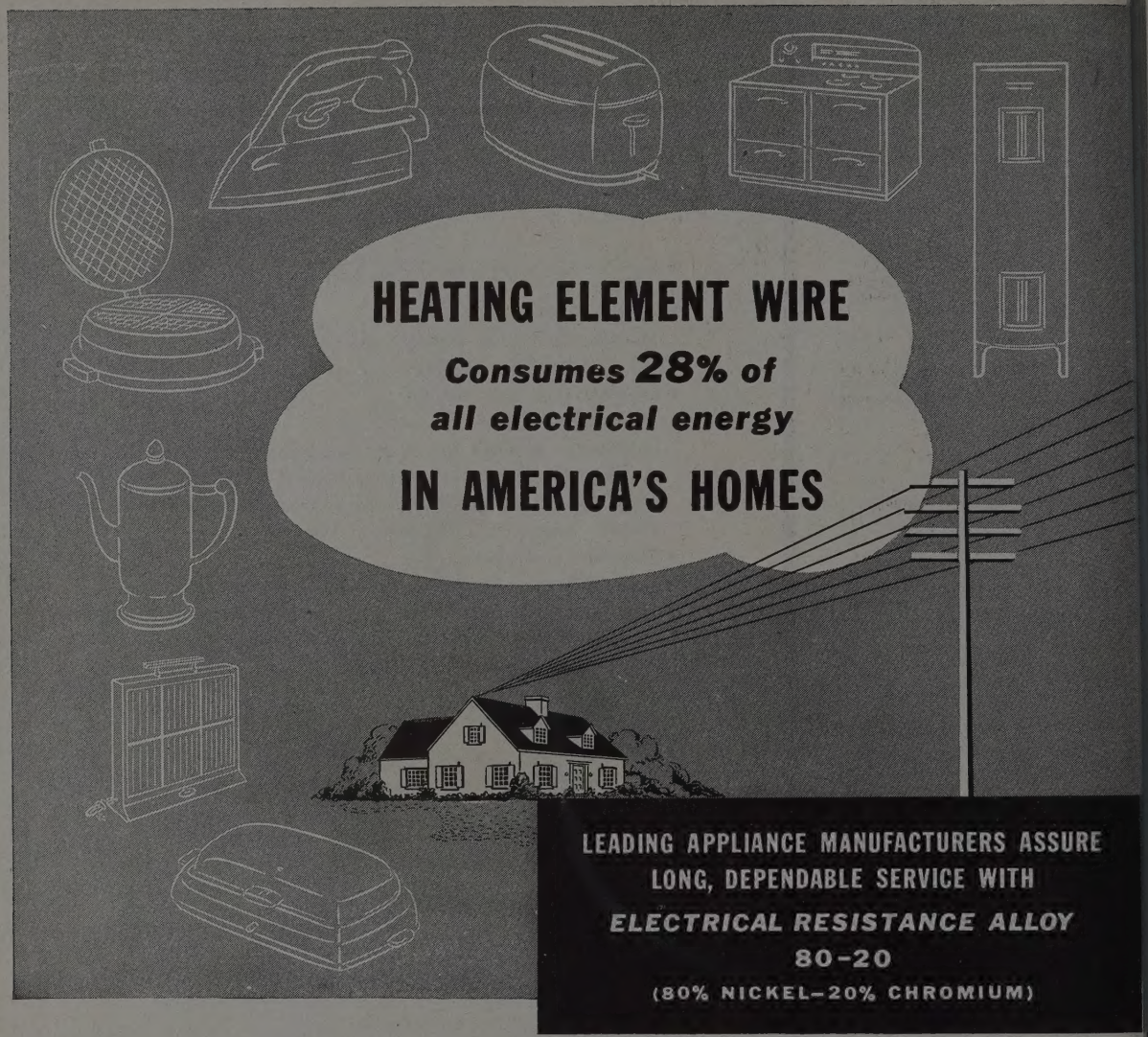

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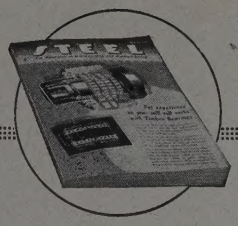

September 22, 1947

Significant Show

To see the 1947 Machine Tool Show now in progress in Chicago is to behold the master tools with which American industry will meet the challenge of tomorrow.

Those who traveled miles through the aisles of the spacious Dodge-Chicago plant knew almost instinctively that they were witnessing machines and equipment that will play an important part during the next few years in the solution of major social and economic problems at home and abroad. Those who heard the numerous addresses at the dinners comprising the 1947 Machine Tool Congress realized how greatly improved must be our understanding of these social and economic problems if we are to employ to best advantage the fine machinery and equipment that now is available.

One could not watch the 10-station rotary gear shaper which machines 20 automobile timing gears every 2½ minutes, the crankshaft turn milling machine which finishes six bearings in one minute, or the numerous other outstanding machines without thinking of the many developments which have brought such machines into being.

In the first place, there would be no demand for such equipment in any but a highly mechanized society. We had to develop an economy in which scores of millions could purchase and operate automobiles and other mechanical devices before machines of this type could be justified. Now they are ready to serve us by further increasing the productivity of a workman's hand and time. They are the finest current example of how the investment of money in equipment can justify unprecedently high wages and at the same time produce more goods for more people at less cost.

Another thought that must have struck every show visitor is the fact that only in America could a show of this size and character be held today. Realization of this fact takes on additional significance when one considers the implications of Secretary of State George C. Marshall's charges against the Soviet Union and his proposals for revamping the United Nations.

Russian diplomats who might be tempted to take the U.S.S.R. out of U. N., might think differently if their engineers were to tell them that if the iron curtain were turned the other way, machines of great potential such as those on view at the 1947 Machine Tool Show, would be barred from their country.

It will be difficult to over-estimate the significance of this show. What it represents in opportunities for the future means much to the nation and to the world.

* * *

THE DILEMMA IN STEEL: Collectively the testimony of steel producers before the steel subcommittee of the Senate Small Business Committee constitutes the most complete answer yet given to those who favor immediate large-scale expansion of steel capacity.

The steel executives pointed out that more steel capacity would call for more scrap, which is not in sight; that a 10 to 30 million ton expansion would require development of new iron ore resources before the industry is prepared to utilize low-grade ores; that suitable metallurgical coal is not now available in sufficient quantities; that finished steel urgently needed by consumers would be diverted for new steel facilities; that increased construction costs would necessitate that steel produced in the new facilities be sold at prices $15 to $20 a ton above prevailing quotations; that new capacity started now could not be finished until after supply has balanced demand and finally that labor to build and operate the new facilities is not now available.

In the main these points are sound and cannot be brushed aside lightly. Perhaps the most practical

(OVER)

way to relieve the present situation is to try to speed up the considerable expansion work now in progress, to try constantly to improve the production and distribution of steel and to strive to utilize steel more economically. We have not exhausted the possibilities in any of these three areas. —p.46

* * *

INTEGRATION UPWARD: Sale of an 84-in. plate mill to International Detrola Corp. by Lukens Steel Co. adds one more transaction to the half dozen or more that have taken place during the past year whereby a fabricator or manufacturer has purchased steelmaking or rolling facilities.

It is apparent that the acute shortage of steel, particularly of flat rolled products, is the principal spur to this invasion of the steel industry by consumers. In some respects, this trend appears to run counter to the increasing tendency among steel producers to carry integration of operations downward into the fabrication and manufacture of end products.

However, both trends have one thing in common. They tend to increase the proportion of steel earmarked for specific consumers and to reduce that offered on the open market to all consumers. This latter result has serious implications which, if not corrected automatically by the return of a buyers' market, will call for some other means of correction. —p. 48

* * *

STUDIES TO CUT COSTS: In an address before the Purchasing Agents Association in Chicago, Albert J. Browning, vice president and director of purchases of Ford Motor Co., explained in detail the overhauling of the purchasing department of Ford that has been under way for over a year.

Among measures taken to improve purchasing procedure was the establishment of a commodity research department and a purchase analysis department. Mr. Browning presented a number of illustrations of how these departments have helped to find substitutes for scarce materials and to reduce the cost of numerous parts. He estimates the studies initiated by these departments will save Ford $10 million a year.

Few companies in the metalworking industries can justify full-fledged departments of the type cited by Mr. Browning. However, thousands of companies, by employing the technique on a smaller scale, can effect worthwhile savings in costs. Eliminating a few cents of unnecessary cost here and a few cents there soon will be the order of the day. —p. 62

SIGNS OF THE TIMES: President Truman's Aid to Europe Committee, headed by W. Averill Harriman, is in agreement on the policy that instead of shipping finished steel products to Europe (p. 52), the United States should ship the steel in its final fabricated form, as machinery, to the end that the scrap generated in fabrication may be retained for use at home. . . . Some employers are highly pleased with the manner in which colleges and high school students and teachers, working in industrial plants during their summer recess, served to fill in the gaps caused by vacations for regular employees where a staggered vacation plan is used. Carnegie-Illinois Steel Corp. has initiated a supervised training program for college undergraduates (p. 57) designed to encourage them to return in succeeding summers and to become full time employees after graduation. . . . Electric power distribution in the week ended Sept. 13 totaled 5,053,300,000 kilowatthours (p. 64)—a new all-time record. . . . Costly equipment in metalworking plants in regions of high lightning frequency and intensity can be protected from lightning damage (p. 88) by the proper installation of arresters and capacitors wherever electrical circuits leave plant buildings. . . . At the preview dinner at the 1947 Machine Tool Show, Governor Dwight H. Green of Illinois called attention to the significant coincidence that this great show (p. 43) was officially opened on the 160th anniversary of the signing of the Constitution of the United States. . . . Inland Steel Co. has purchased 11,569 tons of Swedish iron ore (p. 48) for experimental purposes. . . . Instrument Society of America, which held its second annual conference and exhibit in Chicago, Sept. 8-12 (p. 51), now has a membership of over 2500 despite the fact it is less than two years old. . . . West Coast fabricators are feeling the pinch of a marked contraction in export trade, due primarily to export restrictions imposed by many foreign countries because of dollar shortages. A notable exception is oil country goods and equipment for export (p. 50) the volume of which is increasing. Much of this is for American oil companies having large holdings abroad. . . . Department of Labor places labor union membership in the United States and Canada at about 15 million. Affiliates of AFL report 7,500,000 members, CIO unions 6,000,000 and other unions about 1,750,000. Total union membership in 1933, says the department (p. 56), was less than 3 million.

E. L. Shaner

EDITOR-IN-CHIEF

STEEL...

Backbone of Industry

The country's return to normal peacetime operation is dependent, to large extent, upon how fast the nation's mills can turn out steel for industrial and consumer goods.

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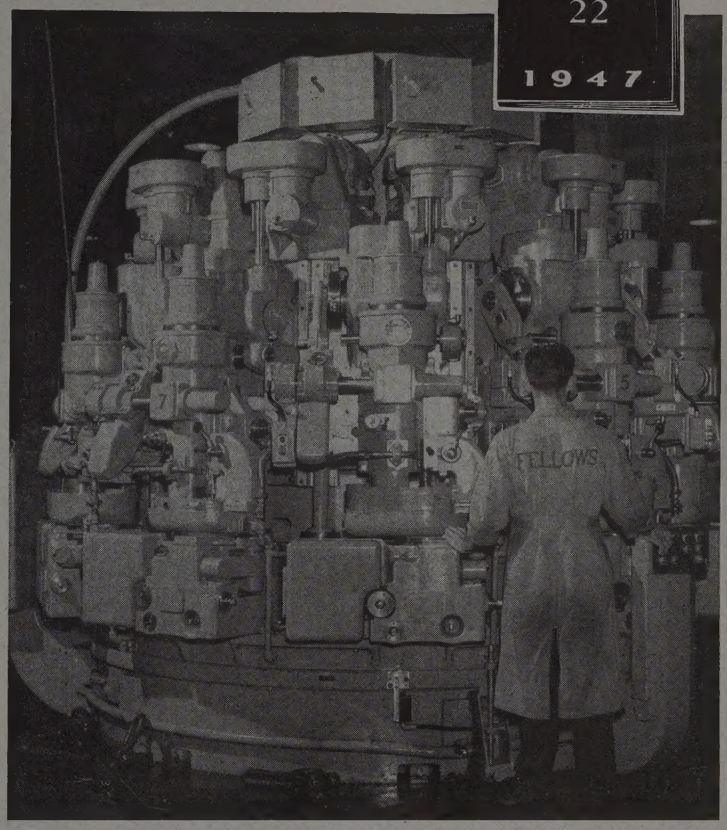
Machine Tool Show Draws Huge Crowds To Chicago

New designs in machines, tools and attachments bring to fore progress of past 12 years. Trend is toward time cycle control and automatic operation. Emphasis placed on practical workability, rather than futuristic fantasy

By GUY HUBBARD
Machine Tool Editor



This 45-ton rotary gear shaper produces 20 automobile timing gears every 2½ minutes. One of the exhibits at the 1947 Machine Tool Show, it is so big that a doorway had to be torn out to get it on the show floor

CHICAGO

WITH the National Machine Tool Builders Association's Machine Tool Show at the Dodge-Chicago plant at the halfway point, all indications are that estimated attendance of 100,000 will be considerably exceeded.

Many instances have been reported where additional experts in equipment, tools and production have been rushed to the show at the urgent request of company executives already on the ground.

Considerable regret has been evident on the part both of exhibitors and of visitors at the relatively brief "working life" of the show—amounting to only nine working days. Simple arithmetic proves that with nearly 300 exhibitors showing about 2000 machines, the time that any individual can devote to each unit is very small. However, there is little or no possibility of an extension because of the scheduled plans for removal which already have been arranged by exhibitors.

Widespread approval is heard of the manner in which this huge show is being conducted and the unusual suitability of the building in which it is being held. The purpose of many of the strict rules enforced by the management is now self-evident. Commercialism of the objectionable kind is entirely absent. Salesmanship of the highest order is universal. This project gives other industrial exhibitions a model which well can be followed if this branch of marketing technique generally is to be lifted to the level where it belongs.

Reports to the effect that there would be few really new things in this show now are proved to have been definitely wrong. By no means every machine is a new model, but those which are not new carry tools and attachments which elevate their levels of performance to new highs. Actually there are a great many designs which are entirely new or so greatly improved as to amount to new designs. This is noticeable in fields ranging all the way from simple cutting-off machines to production gear cutters with emphasis on elimination of lost time in loading and unloading work, in returning slides and tables to working position, in disposal of chips and in the ease, comfort and safety of operation.

There is a strong trend toward time cycle control and to automatic operation. Automatic machines have been improved to shorter setup time and to avoid use of expensive special cams, etc., thus making automatic operation on short runs feasible.

In a number of cases station-type machines are built so that two or more kinds of work can be machined at one time.

A noticeable thing at this show is almost complete absence of radical appearance of the so-called "streamline" variety. Frames, guards, covers, etc. are smooth with rounded corners, but the effect is that of sensible solidity rather than futuristic fantasy. The clean, smooth paint work of prewar days is back in a standardized light gray shade which looks well, lights up the working areas well and invites neatness on the part of operators and service men. Particular attention has been paid to ease of servicing

mechanical, electrical and hydraulic units.

The whole effect of this show is a vast, varied, practical, working machine shop. Superficial booth decoration has been avoided. Emphasis is on visibility of exhibits and ample space around machines. Many booths are open on four sides. There are few if any trick setups although there are some truly sensational practical setups. Some of the most sensational cuts are on large planers, whose tables literally "flash" back to starting position.

There is considerable emphasis throughout the show on methods which conserve material. Many machines are being demonstrated on forgings, which in previous shows would have been operating on material which had not been preformed. In a number of cases, materials once considered "unmachinable" are being machined, in some instances by crush formed grinding wheels. These wheels are not limited to circular work. Many of them are being used in heavy duty surface grinding.

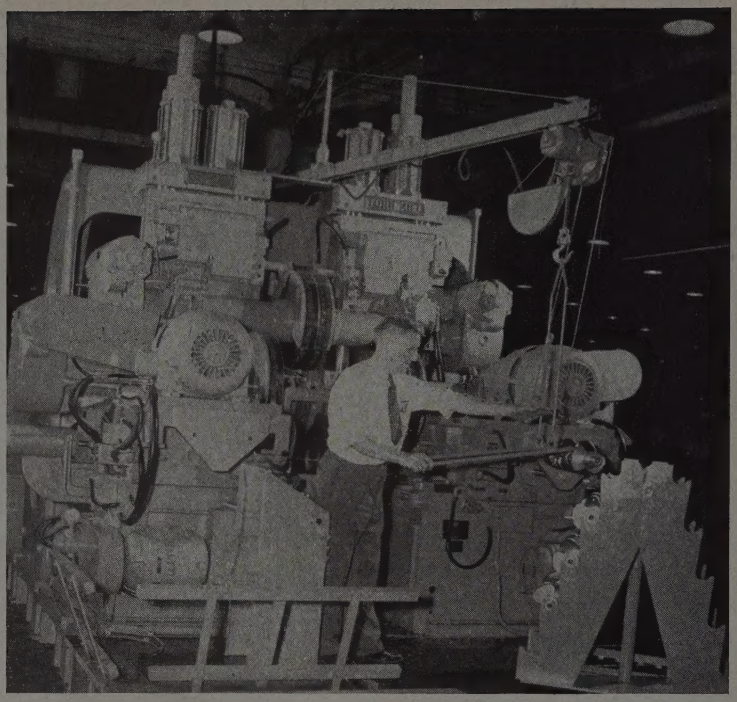
All in all this show brings to the fore a lot of behind-the-scenes work which has been going on for 12 years, nearly seven of which were war years for the United States or for our allies. Machine shop practice is not revolutionized over night, or in a year or even in 12 years. But the changes exemplified by this show certainly give those with prewar plants and prewar equipment some very serious food for thought as to what the future holds.

All indications are that this show will touch off some "chain reactions" in the competitive fields of metalworking which will mean some substantial business for the machine tool industry and the tool engineering profession. This is rather inevitable if consumer goods are to be held within reach of consumers as far as prices are concerned. There are some observers who go as far as to say that machine tool user reaction to this show will determine whether we are due for "a boom or a bust" in this country. Be that as it may, it is certain that this show will affect equipment programs and manufacturing policies for a long time to come.

Surplus Machine Tool Sales To Civilians Halted by WAA

Sales of government surplus machine tools has been halted by the War Assets Administration to permit the armed forces to set aside any of them they deem necessary for defense needs.

After the supply has been screened, as much as 75 per cent of the tools in surplus inventories may be withheld from the market indefinitely, perhaps permanently.



First of its kind, this 100,000-*lb crankshaft turn milling machine, which turns the six pin bearings of an automobile crankshaft in one minute, is typical of the newest machine tools of* 294 *manufacturers displayed at the* 1947 *Machine Tool Show*

Machine Tool Distributors See Show Spurring Last Quarter Sales

CHICAGO

ONE of the largest annual meetings in its 23-year history was staged by the American Machine Tool Distributors Association at Hotel La Salle, Monday, Sept. 15. Meeting was integrated with the National Machine Tool Show at the Dodge-Chicago plant, in which the distributors are taking an active part as representatives of many machine tool builders and as members of an association whose work in many respects ties in closely with that of the National Machine Tool Builders Association.

When President George Habricht Jr. opened the meeting, he pointed out that the AMTDA booth is a message and information center at the big show, and that a corps of members, wearing "Ask Me" badges, is on duty at all times when the show is operating.

The business of the meeting was almost entirely confined to the relation of the show and the distributors. Considerable optimism was expressed that the show would break up the doldrums of the past two months and would serve to make the overall sales volume for 1947 a rather satisfactory one. Reports indicated that in most regions the cream has been skimmed off the WAA stocks of machine tools.

Statistical services covering the 145 member companies of the association are being expanded and studies are being made in numbers of calls per sale and cost of calls. At the present time 85 per cent of the machine tool builders are selling wholly or in part through the membership of AMTDA.

The annual dinner was held at the La Salle Hotel on Wednesday, Sept. 17, as the opening event of the Machine Tool Congress, with George Habricht Jr. presiding, and with opening remarks by K. H. Hobbie, president of the Machine Tool Congress, and Herbert H. Pease, president, National Machine Tool Builders Association.

Guest speaker was Fulton Lewis Jr., news commentator, whose subject was, "Democracy with a Gun in Her Ribs." He dealt with the not too bright foreign situation. In connection with one of America's important elements of strength is its production power as exemplified by its strong machine tool industry.

At the annual dinner certificates of

honorary membership were presented by Past President Al B. Einig to William F. McCarthy, J. Roy Porter, J. W. Wright and John Sauer Jr. for outstanding services to the association.

New officers of the association for 1947-48 who took office at the closing session of the meeting are: President, D. N. Macconel, Machinery Sales Co., Los Angeles; first vice president, R. L. Giebel, Giebel Inc., New York; second vice president, O. W. Johaning, Colcord-Wright Machinery & Supply Co., St. Louis, Mo.; secretary-treasurer, C. C. Brogan, W. E. Shipley Machinery Co., Philadelphia.

New members of the executive committee are George Keller, W. W. Radcliffe, and Edward F. Strauss. Thomas A. Fernley Jr. was reappointed as executive secretary.

U. S. Steel To Test All-Basic Open Hearth

A 122-ton all basic open hearth furnace has been installed at South Chicago, Ill., by Carnegie-Illinois Steel Corp. to try out faster methods for making steel. Various speed-up processes, including the use of oxygen in various types of burners and use of preheated compressed air for the atomization of oil, will be tested in the new installation.

The furnace will be operated under commercial conditions to spearhead the research efforts of the parent United States Steel Corp. Results will be studied to determine the advantages of various grades of furnace lining brick when combustion is hastened and unusually high temperatures result.

In addition to experiments with use of oxygen and preheated compressed air, studies also will be made of flame radiation and other matters.

Egypt Plans To Build U.S.-Financed Steel Mill

Commitments for American capital have been obtained to finance the first major steel plant in Egypt, it was revealed last week by Leon Setton, Cairo industrialist. The plant will utilize a reduction process developed by H. A. Brassert & Co. Inc., New York, iron and steel consulting engineers, employing oil or natural gas without recourse to coking coal or limestone. Egypt has no coal but has oil along the Red Sea coast.

Plant will be built in the south of Egypt in the province of Assuan and will have a capacity for 500 tons a day.

Mr. Setton says he intends to purchase in this country $60 million worth of equipment and machinery, including oil pipelines and installation apparatus.

The enterprise will be capitalized at $80 million, of which $60 million will be raised here.

Mr. Setton says the province of Assuan has a "vast deposit of iron ore" which compares favorably with Lake Superior ore.

Porcelain Enamelers Hear Discussion of New Methods

Ninth annual forum of Porcelain Enamel Institute, Sept. 10-12, at Ohio State University, Columbus, O., was attended by 217 persons representing manufacturers of all types of porcelain enamel products, and suppliers' groups, including frits, chemicals and equipment.

First two days of the forum were devoted to discussion of plant operations. A feature of the first day's session was demonstration of apparatus developed at the Bureau of Standards through a P.E.I. research fellowship for evaluating adherence of porcelain enamel to steel.

Paper by J. E. Hansen, Ferro Enamel Corp., Cleveland, on "How to Choose the Correct Type of Porcelain Enamel for Specific Applications" provided practical information on characteristics of various types of porcelain enamel now on the market and also their adaptability for service in different kinds of products such as refrigerators, washing machines, table tops, and architectural service.

Panel discussion on "Different Systems of Metal Surface Preparation" covered a subject of perennial interest to porcelain enamelers. Clean metal is vital to successful porcelain enameling.

Discussion of "Fuel Oils" by William Jones, North American Mfg. Co., Cleveland, and the paper on "Use of Liquefied Petroleum Gas" presented by E. A. Jamison, Phillips Petroleum Co., Bartlesville, Okla., covered important processes which are being used both for standard and stand-by equipment.

Maintenance of accurate temperature controls for successful porcelain enameling was discussed in detail by John Green, Brown Instrument Co., Philadelphia, in his paper on "Pyrometry and its Application in Porcelain Enameling Plants."

Present, Past and Pending

■ KAISER TURNS TO ALUMINUM FOR GAS TANKS

WILLOW RUN, MICH.—General purpose aluminum utility sheet is being used to replace steel in a number of stampings for Kaiser-Frazer automobiles. First application is for seam-welded gasoline tanks, the 21-gallon aluminum tanks weighing 7 lb against 22 lb for steel tanks. The aluminum sheet is rolled at Kaiser's Spokane, Wash., Permanente Metals Corp. plant.

■ ARMY TO SCRAP OBSOLETE SHELLS

WASHINGTON—By scrapping obsolete ammunition, the Army expects to make 500,000 tons of scrap available to the steel industry by next July. To aid the program, Secretary of War Kenneth Royall has authorized that civilian scrap experts be given free access to Army depots to examine material that can be used for scrap.

■ BARIUM BUILDING 70 PORT CRANES FOR FRANCE

NEW YORK—Barium Steel Corp. has started delivery of 70 specially-built Whirley gantry cranes under a $6.5 million order from the French government. Cranes are being constructed by the Clyde Iron Works of Duluth, Minn., Barium subsidiary, and will replace equipment destroyed at French ports during the war.

■ CARNEGIE REBUILDS GARY BLAST FURNACE

CHICAGO—Carnegie-Illinois Steel Corp. has completed the rebuilding and enlargement of its No. 6 blast furnace at Gary, Ind. Capacity has been raised from 870 tons to 1508 tons.

■ FORD LEASES DETROIT NAVAL ORDNANCE PLANT

DETROIT—Former naval ordnance plant at Mound and Nine-Mile roads has been leased to Ford Motor Co. for machine and stamping operations incident to manufacture of parts and assemblies for 1948 model cars and trucks. Plant includes a million square feet of floor space in 15 buildings on a 42-acre site.

■ NASH-KELVINATOR ORGANIZES PLASTICS DIVISION

MILWAUKEE—Nash-Kelvinator Corp. has organized a plastics division here for the molding of a number of large refrigerator parts. Division is housed in a plant providing 33,000 sq ft of floor space and is under direction of W. F. Poupard.

Steel Shortage Seen Ended by 1949

Two more years may be required to reach supply-demand balance. Billion-dollar expansion now underway soon will add to flow of metal to consumers' plants, but producers say gargantuan additions suggested are not feasible

DURABLE goods manufacturing companies, hard pressed for steel supplies ever since the war ended, can expect little relief from the shortage in the immediate future.

Best estimates by top steel producers now is that two more years will be required to bring steel supply into balance with domestic and normal export demands. Should demands for export be increased greatly or should production again be interrupted by coal or steel strikes, or for other reasons, balance may not be achieved until later.

This was the conclusion gained from the testimony of the country's leading steel executives before the steel subcommittee of the Senate Small Business Committee in Washington Sept. 12.

Large-scale expansion of steelmaking facilities—such as the 10 to 30 million tons proposed by some steel consumers, labor union leaders and government economists—is not feasible at this time and could not be effected in time to cope with the current shortage, which is based on abnormal demands, according to the steel men. Substantial expansions, however, are now underway and soon will be adding to the flow of steel to consumers' plants.

Cite Obstacles to Expansion

The steel men's testimony constitutes the most complete answer yet given to the proponents of large-scale expansion. Among the obstacles to such expansion, the steel executives cited:

1. Scrap steel supply currently is inadequate for present steelmaking capacity. Production in 1947 will fall about 6 million tons short of rated capacity, due largely to the scarcity and poor quality of scrap. More steelmaking capacity would call for more scrap, which is not in sight.

2. Other raw materials would be short. A 10 to 30 million ton expansion would require the development of new iron ore resources before the industry is prepared to utilize the abundant lower-grade ores. Suitable metallurgical coal is not now available in sufficient quantities. Coke has been short since the war started.

Top steel management appears before the steel subcommittee of the Senate Small Business Committee to explain expansion programs and defend long-term adequacy of steel capacity. Clockwise around the hearing table are: Benjamin F. Fairless, president, United States Steel Corp.; E. G. Grace, chairman, Bethlehem Steel Corp.; George R. Fink, president, National Steel Corp.; Frank Purnell, president, Youngstown Sheet & Tube Co.; Adm. Ben Moreell, president and chairman, Jones & Laughlin Steel Corp.; Tom M. Girdler, chairman, Republic Steel Corp.; Hiland G. Batcheller, president, Allegheny Ludlum Steel Corp.; Newell H. Orr, vice president, Colorado Fuel & Iron Corp.; Wilfred Sykes, president, Inland Steel Co.; Henry A. Roemer, president, Sharon Steel Corp.; W. W. Sebald, executive vice president, American Rolling Mill Co.; Archie J. McFarland, president, Wheeling Steel Corp.; J. L. Neudoerfer, vice president, Wheeling Steel Corp.; unidentified committee reporter. In foreground, backs to camera, are committee members. Acme photo

3. Finished steel urgently needed by consuming industries would be diverted to build the new steelmaking facilities. Ten million tons of new capacity would require 1.5 million tons of finished steel.

4. Increased construction costs now prevailing would necessitate that steel produced in the new facilities be sold for $15 to $20 a ton more than prevailing prices. Costs for new facilities now range up to 3½ times 1939 costs. Ten million tons of new capacity probably would cost in excess of $2 billion.

5. New steel capacity started now would produce no steel for at least two years—probably longer. Steelmakers believe that present capacity and that under construction will balance supply and demand within two years.

6. Labor to build and operate new facilities on the scale proposed is not now available.

The testimony of the steel executives culminated several months of investigation by the committee of steel shortages, distribution, the gray market in steel and the adequacy of present capacity.

The steel men pointed out that capacity is being increased moderately and that 2.5 million tons of ingotmaking capacity are scheduled for completion in 1947 and 1948. Three million tons of blast furnace capacity, 3 million tons of coke capacity and 3 million tons of sheet and strip capacity are likewise under construction. Substantial increases in capacity for finished products other than sheet and strip also are being made.

Technological improvements now being developed will result in large increases in effective steel production from present facilities without encountering all the obstacles to construction of new facilities. Among these are the use of oxygen in open hearth steelmaking, by which some companies have been able to boost output by 20 per cent or more on a limited number of furnaces.

Pressure blowing promises substantial increases in pig iron output from blast furnaces and economical use of ores not now regarded as usable.

Development of the low-alloy, high-tensile steels are permitting reduction

in gages to a point that 3 tons of material now can often do the work formerly done by 4 tons.

Increased attention is being devoted to coal washing plants to provide a higher grade coke, to beneficiation of iron ore, to basic furnace linings and to better materials handling installations, all of which will help increase output from present facilities.

Individual producers told the committee what their companies are doing to expand capacity and production. All stressed that while steel currently is in short supply, that this is due to abnormal demand arising from postwar conditions. Consensus of the steelmakers is that present capacity plus that projected will be adequate for both domestic and normal export needs within the next two years.

Benjamin F. Fairless, president, United States Steel Corp., told the committee U. S. Steel is installing new facilities costing half a billion dollars and currently is spending $20 million a month for additions and improvements.

"Major items in this construction program include new by-product coke ovens, with annual capacity of about 1.9 million tons; new blast furnaces, which will increase our iron capacity by about one million tons; new facilities for increased production of ingots, tin plate and tubular products and new capacity for the manufacture of wire products."

U. S. Steel Builds Mill

U.S. Steel has under construction new sheet mill and collateral facilities which will raise sheet and strip capacity by about 600,000 tons. In addition, Columbia Steel Co., a U. S. Steel subsidiary, has just announced a new cold reduction mill in the Los Angeles area, which will add 300,000 tons by the end of 1949 (see column 3, this page).

Bethlehem Steel Corp. is spending a quarter of a billion in postwar expansion, E. G. Grace, chairman, said. The expansion will add 800,000 tons to Bethlehem's ingot capacity.

"In the flat-rolled steel products where there is particularly strong demand, Bethlehem's program adds flat-rolled facilities having a yearly capacity of 2,000,000 tons."

T. M. Girdler, chairman, Republic Steel Corp., said Republic's prewar facilities now are producing 17 per cent more tonnage than they were capable of doing in 1939, the result of enlarging and improving furnaces and of greater operating efficiency.

Regarding large physical expansion of the steel industry, Mr. Girdler told the committee he believes such expansion "at this time would contribute nothing but further inflation. Our national economy will best be served if we gear our production to normal or near-normal demands as we can most scientifically foresee them. I believe the people of our country will be far better off five years from now for having endured for a little while longer the necessary, but not very serious, privations of getting along with a few less new cars, a few less refrigerators. Such a course is our best defense against breadlines, relief and communism."

George R. Fink, president, National Steel Corp., said that in 1945, as soon as the government permitted, that company undertook to expand cold-rolled sheet capacity from 700,000 tons to 1,200,000 tons, a 70 per cent increase.

National also is building additional open hearth facilities which will increase ingot capacity 30,000 to 40,000 tons monthly, or about 10 per cent. This will be in production in November or December this year.

National is planning expansion at Weirton to raise capacity by 10 per cent, to be completed by the end of 1948.

The total increase in ingot capacity will be about 780,000 tons.

"The substantial increase of ingot capacity is a gigantic task. In our case it means the opening of new coal properties, increased ore properties, and of course, a better supply of scrap. It is certainly the policy of this company to continue increasing its facilities if scrap and other materials are available. The record of the steel industry shows that we are not alone in this policy."

Henry A. Roemer, chairman and president, Sharon Steel Corp., said his company in the past 2½ years has spent $9,125,000 in the acquisition of additional facilities for finishing and for new equipment. An additional $4 million will be spent over the next 9 to 12 months for new rolling mill equipment.

W. W. Sebald, executive vice president, American Rolling Mill Co., reported postwar additions to ingot capacity by his company will total 333,000 tons by the early part of 1948, an increase of 10.2 per cent. Company spent $52 million in the past three years and will make further capital expenditures of $20 million in 1948 and 1949.

Other steel executives appearing before the committee included: Adm. Ben Moreell, president and chairman, Jones & Laughlin Steel Corp., accompanied by A. J. Hazlett, vice president in charge of sales and commercial development, and H. Parker Sharp, vice president and general counsel; Frank Purnell, president, Youngstown Sheet & Tube Co.; Wilfred Sykes, president, Inland Steel Co.; Archie J. McFarland, president, Wheeling Steel Corp.; accompanied by J. L. Neudoerfer, vice president in charge of sales; Hiland G. Batcheller, president, Allegheny Ludlum Steel Corp.; and Newell H. Orr, vice president in charge of sales, Colorado Fuel & Iron Corp.

The steel men denied their companies had participated in gray market dealing, although they recognized the existence of such a market. Where evidence was uncovered that recipients of steel from the mills were diverting the tonnage to the gray market, those customers were cut off the lists. Much of the steel involved in the gray market, one company reported, left the mill on government priorities.

Several of the steelmakers presented figures to show that the small fabricators were treated equitably in the distribution of available steel. Warehouses, for example, were reported receiving a greater than normal tonnage despite the shortage situation.

Columbia Steel To Build 300,000-Ton Cold Mill

A cold reduction mill with capacity to produce 300,000 tons of sheets a year will be built by Columbia Steel Co., United States Steel Corp. subsidiary, in the Los Angeles area. Construction will be completed by the end of 1949, provided no unforeseen delays occur.

The mill is in addition to new facilities under construction in the San Francisco area.

In addition to cold-reduced sheets, the new mill also will be equipped for hot-rolled sheet processing and for sheet galvanizing and coating, in order to meet the West Coast demand.

In August, 1945, U.S. Steel announced that studies were being made with a view to modernizing Columbia's steel facilities in the Los Angeles area. A modern cold reduced sheet mill was a part of that contemplated program.

The Torrance mill of Columbia Steel Co. in the Los Angeles area, which has been in operation for 30 years, produces merchant bars and light structural shapes, among other products. The operation of the Torrance mill will be continued.

Kaiser Asks Tax Aid For Steel Expansion

Accelerated depreciation allowances for tax purposes to encourage building of new steelmaking facilities was recommended last week by Henry J. Kaiser, West Coast industrialist.

Kaiser advocated restoring the wartime tax amortization section of the Internal Revenue Act under which management could claim income tax exemption at the accelerated rate of 20 to 25 per cent a year, against the peacetime rate of 4 per cent.

Acquisition of Steel Plants by Consumers Spurred by Shortages

Purchase of plate mill from Lukens Steel Co. by International Detrola directs attention to expanding activity of metalworking firms in steel production field. More manufacturers reported considering acquiring steel producing facilities

METALWORKING industry executives last week raised a quizzical eyebrow when word got around in the trade that Lukens Steel Co., Coatesville, Pa., had just sold to the International Detrola Corp., Detroit, an 84-in. plate mill which Lukens had not operated since January, 1945.

Purchase of the mill by Detrola was seen as indicating that company is preparing to increase its activities in the steel producing and rolling field, emphasizing the increasing tendency of large steel consuming interests to become steel producers.

International Detrola is primarily a manufacturer of diversified end products. However, a year ago it became a steel producer through acquisition of the Andrews Steel Co., Newport, Ky., and subsidiary properties, thus adding to its operations an open hearth plant, blooming mill, specialty sheet rolling mill, a steel fabricating department and a coal mine. Later the company acquired by purchase from the Wheeling Steel Corp. a blast furnace at Martins Ferry, O.

Others Taking Similar Action

Entrance of this manufacturing interest operating in the refrigeration, radio, aircraft, machinery and other finished product fields into the steel industry came at a time when a number of other manufacturers were taking similar action or were contemplating doing so.

For instance, within the past year or so General Electric Co., Schenectady, N. Y., acquired the Mahoning Valley Steel Co., Niles, O., producer of sheet steel; Kaiser-Frazer interests acquired steel and blast furnace properties either by purchase or through lease, including the Chapman-Price Division at Indianapolis of Continental Steel Corp., and the Struthers Furnace Co., Struthers, O., as well as effecting a tie-in for steel supply with Portsmouth Steel Corp., at Portsmouth, O.; Barium Steel Corp., New York, holding company for 16 diversified manufacturing subsidiaries, acquired the Central Iron & Steel Co., Harrisburg, Pa.; Borg-Warner Corp., Chicago, added to its steel producing properties by acquiring the Superior Sheet Steel Co. at Canton, O. More recently a syndicate of 25 fabricators known as the Phoenix-Apollo Steel Co., acquired the Apollo Steel Co. at Apollo, Pa., and the Phoenix Iron Co. at Phoenixville, Pa.

The acute shortage of steel, especially sheets, ever since the end of the war, is the principal cause for this invasion of the steel producing field by consuming industry. In some respects, this invasion counters a trend in the steel producing field to extend into end-products manufacturing. And with the steel shortage promising to continue for months into the future, expectations are that manufacturers, especially the larger steel consuming interests and companies lacking historical purchasing backgrounds with established steel mills, will be inclined to give increased consideration to the possibility of becoming steel producers as a means of assuring themselves adequate steel supplies. As a matter of fact, currently a company which operates in a wide list of diversified manufacturing fields is reported looking into the possibilities of acquiring a substantial stock interest in a steel producing company in western Pennsylvania. Also, it is reported two small manufacturers of tubing are looking around for a likely primary steel producing property. Few such properties, however, are known to be available.

Acquisition of these steel producing properties by manufacturing interests has removed some steel tonnage from the open market, but just how much is not known since in several cases, at least, the purchasers have continued to dispose of some of their steel output to the general trade. In the case of the Detrola company, its acquisition of the Andrews Steel properties was made with a view to furnishing its own manufacturing subsidiaries with steel, but at the same time the company also entered into three-year contracts with a number of manufacturing companies for sale of its steel products, these companies being Bendix Home Appliances Inc., F. L. Jacobs Co., Jack & Heintz Precision Industries Inc., Neon Products Inc., Philco Corp. and Prentiss-Wabers Products Co. Under these contracts each of the companies named loaned to Detrola cash equivalent to approximately one-tenth of the total purchase price named in the contract, the loans to be paid off by credits against the purchase price of steel delivered under the contracts.

To just what use Detrola will put the 84-in. mill it has just acquired from Lukens is yet to be announced by the company. However, trade opinion is that it will be converted to production of sheets. The mill, purchase price of which was not disclosed, has not been operated since January, 1945, when Lukens' new 120-in. mill began operations. Lukens also operates a 140-in. and 206-in. mill. It is understood Detrola will dismantle the 84-in. mill by Mar. 31, 1948, and reassemble it at Newport, Ky., to operate in conjunction with the company's other steel facilities.

Detrola now has manufacturing plants in Michigan, Indiana, Ohio, Kentucky, California and Ontario, Canada. Sales for the nine months ended July 31 were $53,028,515, compared with $25,790,435 for the comparable period ending in July, 1946. Net profit for the nine-month period was $1,139,907, compared with $950,000 in the similar 1945-46 fiscal period. Current financial figures include for the first time the operations of the company's Steel Division and Universal Cooler Co. of Canada Ltd., which last February became a wholly-owned subsidiary.

Officers of International Detrola Corp. are: C. Russell Feldmann, president; William A. Alfs, vice president and general counsel; Fleming W. Johnson, vice president in charge of manufacturing, Eastern Division; George E. Bodem, vice president and general manager, Radio Division; F. S. McNeal, vice president and general manager, Universal Cooler Division; Charles H. Stamm, vice president and general manager, Newport Rolling Mill Division; W. Austin Ellmore, vice president in charge of sales and engineering, Utah Radio Products Division; R. J. Nixon, treasurer; H. E. Hamilton, secretary and assistant treasurer; Robert L. Purcell, controller; R. P. Schmelzer, assistant secretary and assistant treasurer; R. L. Dillon, assistant secretary and assistant treasurer; H. W. Boal, assistant treasurer; W. W. Cowden, assistant secretary.

Inland Steel Buys Swedish Iron Ore

Inland Steel Co., Chicago, has purchased 11,569 tons of Swedish iron ore, to be used for experimental purposes. The cargo was shipped from Sweden to Montreal, transferred to several small Canadian freighters for shipment to Buffalo, and then transferred to a large lake carrier for shipment to Inland at Chicago.

The shipment of Swedish ore is believed to be the first to be shipped to a steel mill west of Buffalo, although Bethlehem Steel Co. has purchased considerable quantities for use at Buffalo.

Automotive, Building Industries Receive Larger Shares of Steel

Distributors and exporters take smaller tonnage in May than in preceding month. Railroads replace containers as third largest user. Shipments to steel converters and processors are larger

LEADING steel consuming industries —automotive and construction—received larger shares of total shipments in May than in April. Total steel shipments to all metalworking industries were practically the same as in April.

Warehouses and distributors received slightly less steel and tonnage for export dropped appreciably.

In holding its position as leading consumer of steel, the automotive industry, excluding tractors, received 769,177 net tons, or 14.1 per cent of the total of 5,442,343 net tons distributed in May. In April, the automotive industry received 748,880 net tons, or 13.7 per cent of that month's total shipments of 5,445,993 net tons.

The second biggest consumer, construction and maintenance, received in May 539,988 net tons, compared with 528,248 in April.

Rail transportation, in fourth place in April with 430,787 net tons, rose to third place in May by receiving 445,785 net tons. The container-making industry, which ranked in third place in April with 446,478 net tons, dropped to fourth place by receiving 427,927 net tons in May.

Although the automotive industry received more tonnage than any other consuming group, its receipts were less than those of the converting and processing classification and the classification of jobbers, dealers and distributors. Converters and processors received in May 973,847 tons, an increase over their 943,584 tons in April. However, in May they shipped 495,714 tons to members of the industry for conversion into further finished products or for resale, leaving the group's net total receipts at 478,133 tons. In April, converters and processors shipped on for further conversion 463,721 tons, leaving their net total receipts at 479,863 tons.

Receipts of jobbers, dealers and distributors amounted to 909,852 net tons in May, a decrease from 932,563 tons in April. Likewise down were exports, their total in May being 335,322 net tons, compared with 373,596 in April.

Deliveries of Scarce Items Reported Improving

Better balanced inventories and slightly higher employment last month allowed manufacturers to boost their production despite vacations and extremely hot weather, which normally have a dampening effect, a survey by the Purchasing Agents Association of Chicago shows.

Deliveries by suppliers to the companies quizzed were faster in August than in July, making the fifth straight month in which more than 50 per cent of the companies surveyed noted an improvement.

Despite better delivery time for supplies generally, few critical items are keeping production below capacity. Steel of all types was cited as the scarcest item by 58 per cent of those companies which reported that certain product shortages were forcing curtailment.

Steel Distribution Five Months, 1947

(Leading products of all grades, including alloy and stainless)

Market Classification	Net Total (All Products) in net tons
Converting and Processing	2,265,184
Jobbers, Dealers, Distributors	4,371,641
Construction, Maintenance	2,491,342
Contractors' Products	947,144
Automotive, excl. Tractors	3,614,085
Rail Transportation	2,058,647
Shipbuilding	135,231
Aircraft	13,273
Oil, Gas Drilling	356,082
Mining, Quarrying, Lumbering	111,997
Agricultural	511,093
Machinery, Industrial Equip., Tools	1,369,957
Elect. Mach., Equip.	659,235
Appliances, Utensils, Cutlery	644,500
Other Domestic, Commercial Equipment	705,887
Containers	2,032,479
Ordnance, Other Military	12,317
Unclassified	1,823,105
Export	1,761,686
Total	25,884,885

Distribution of Steel Products—May, 1947

(In net tons of leading products of all grades of steel, including alloy and stainless)

Market Classification	Shapes	Plates	Hot Rolled Bars	Cold Finished Bars	Seamless Tubing	Drawn Wire	Hot Rolled Sheets	Cold Rolled Sheets	Coated Sheets	Hot Rolled Strip	Cold Rolled Strip	Total (all products)
Converting and Processing	3,910	37,659	219,329	15,632	12,194	90,342	73,493	4,350	1,596	39,929	7,620	973,847
Jobbers, Dealers, Distributors	65,990	83,429	110,722	43,619	68,933	16,918	74,702	39,571	35,818	10,391	4,218	909,852
Construction, Maintenance	160,581	141,447	34,172	294	30,402	1,581	30,677	4,058	6,847	4,827	1,810	539,988
Contractors' Products	811	16,565	13,950	851	1,751	3,920	47,613	34,849	39,252	8,650	6,098	192,348
Automotive, excl. Tractors	3,900	33,300	152,597	24,122	1,124	21,053	175,999	242,883	8,279	41,800	29,195	769,177
Rail Transportation	48,886	87,664	37,789	756	235	293	28,180	3,024	4,974	2,901	325	445,735
Shipbuilding	4,283	19,284	2,262	198	.....	47	1,668	380	438	49	84	29,274
Aircraft	.....	332	242	440	136	144	201	191	45	103	167	2,162
Oil, Gas Drilling	2,685	6,882	6,821	556	36,730	2	1,854	59	155	50	33	84,956
Mining, Quarrying, Lumbering	3,155	4,151	5,767	286	220	238	1,717	340	182	173	3	25,410
Agricultural	5,145	7,777	42,721	5,068	133	2,948	13,996	2,848	9,354	8,379	452	105,700
Machinery, Industrial Equipment, Tools	22,201	73,638	69,486	27,552	9,901	9,284	26,936	8,346	1,338	12,203	6,216	288,991
Elec. Mach., Equipment	3,246	12,079	8,126	3,934	92	4,470	21,870	9,921	2,247	6,455	3,428	134,783
Appliances, Utensils, Cutlery	99	1,137	1,812	3,743	141	3,338	30,221	50,491	6,625	3,678	7,048	134,079
Other Domestic, Commercial Equipment	859	11,228	6,605	4,521	81	23,750	20,534	38,138	5,215	8,148	14,069	145,511
Containers	112	12,498	2,298	.....	1,010	9,377	62,311	25,328	3,978	15,692	10,274	427,927
Ordnance, other military	.....	2,512	149	89	.....	.....	163	150	.....	3	289	3,910
Unclassified	19,441	3,878	61,825	11,770	15,299	37,097	31,805	1,987	2,240	3,167	40,996	389,055
Export	37,375	38,039	31,771	5,398	14,339	9,576	20,463	10,034	7,267	6,715	1,230	335,322
Total	382,679	593,499	808,444	151,829	193,321	234,378	664,503	476,948	135,850	173,313	133,555	5,938,057
*Less shipment to members of industry for conversion	334	14,726	88,374	1,171	11,299	14,670	50,984	2,777	60	22,880	2,399	495,714
Net total	382,345	578,773	720,070	150,658	182,022	219,708	613,519	474,171	135,790	150,433	131,156	5,442,343

* All of these shipments were made to the group classified as "Converting and Processing."

West Coast Fabricators Pinched By Contraction in Export Trade

Dollar shortage abroad and restrictions on imports reflected in shrinking order volume. Hand tool manufacturer reports export business off one-third in last two months. Steel shipments may be affected

SAN FRANCISCO

MANY West Coast steel fabricating firms are being affected seriously by the curtailed purchasing power of foreign countries and resultant import restrictions which have been set up.

Exports in many instances have been dropping sharply, and, in others, efforts of firms to obtain new business abroad have come to naught because of the dollar shortages which exist almost everywhere.

For example, a large western producer of hand tools reports its export volume has declined a third in the last two months, and further reductions are expected. This company in normal times sells about one-tenth of its total volume abroad. It believes it could double its normal export business if present exchange restrictions were removed.

An official of Kaiser Co. expects further declines in export volume because of import restrictions, citing as clues to the future the lack of inquiries from South America and the Far East. He points out, for instance, that China's purchases of steel and iron products in the three months ending with October will total only $4.5 million.

Many Foreign Projects Stymied

A producer of water heaters had planned to make special heaters for export purposes, but that project has been held up until the foreign picture clears.

Another metal fabricating firm, producing nonferrous products, has unsuccessfully tried to build up foreign outlets for its goods. It sent out 60 letters soliciting orders abroad, but received only two answers. Another company making coolers and blowers is trying to regain its foreign trade which it says was "fairly good" before the war. However, it has been able to obtain only one order thus far.

An exception to this trend is the oil tool industry which is increasing its volume of business abroad. But the reason is that most of these companies deal with American oil firms which have large holdings abroad, and thus no exchange problems are involved.

One large western producer of oil field equipment now is sending about 60 per cent of its production abroad. Another tool firm has increased its shipments to Latin America and expects an increase in business from the Dutch East Indies. A company making filtering materials used in oil refining has doubled its wartime foreign sales. However, its exports to sterling bloc countries are virtually nil and the company fears its production will be hampered if the current trend continues.

Labor Situation Improved

The overall labor picture in the Pacific Northwest metal industry has improved in the last six months. Efficiency has increased, turnover has decreased and union demands are more reasonable. Workers are showing a disposition to remain steadily at work. In some plants certain types of skilled labor are short but there is an ample supply of unskilled workmen. One large fabricator reports labor supply and demand is about balanced although fitters are scarce and outside iron workers are hard to get as Army projects in Alaska have about drained the local market.

Bonneville power executives announce immediate resumption of field construction on 20 power transmission projects of an emergency character and essential to continuous operations. Major construction projects involving approximately $13½ million are specifically provided for in 1948 appropriations. Only the most urgent facilities for service to customers and system improvements, which cannot be delayed for supplemental appropriations, are to be resumed. The projects include transmission lines now awaiting completion in Oregon and Washington, said to be imperative due to increased demand for both industrial and household power in the area.

Plan Copper Development

Large scale development of low grade copper ore bodies in the Far West is being undertaken. Largest project is that of Magma Copper Co. which will begin exploitation of the San Manuel deposit near Tucson, Ariz. Tests show this deposit to be the second largest in the country.

Copper content of the deposit, which is more than a mile long, nearly half a mile wide and 150 to 1500 ft thick, averages less than 1 per cent, but the great size of the ore body indicates operations can be conducted quite profitably.

Anaconda Copper Mining Co. also has announced steps to extract low grade ore from its properties around Butte, Mont. The company plans to spend $20 million in developing a recovery program designed to extract hitherto unprofitable ore.

At the same time, Mountain City Copper Co. has closed its mine at Rio Tinto, Nev., once one of the West's richest copper ore bodies. The closedown was taken because tests have failed to reveal new ore reserves and operations on the remaining deposits can not be carried on profitably.

NEW PIPE LINE: Being unloaded near La Junta, Colo., are 40-ft lengths of steel pipe for a new pipe line that this month will be carrying Texas petroleum products from Dumas, Tex., to Colorado. The 170-mile, 6-in. line will deliver gasoline, kerosene, diesel fuels, propane and butane at a rate of 6000 bbl a day. NEA photo

Display Latest Developments in Instrumentation

Instrument Society of America holds second national conference and exhibit in Chicago, Sept. 8-12

INSTRUMENT Society of America, a technical group less than two years old, conducted a highly successful conference and exhibit at the Stevens Hotel, Chicago, Sept. 8-12. This was the second national instrument conference and exhibit which the society has sponsored, the first having been held in Pittsburgh a year ago.

The society, which has for its objective "to advance the arts and sciences connected with the theory, design, manufacture and use of instruments in the various sciences and technologies," was formally established Jan. 10, 1946, when 17 local groups, many active for a number of years, were brought together. This gave a starting membership of about 1200. Today the society is composed of 30 sections in the United States, one in Canada, and one in Aruba, Dutch East Indies, with a membership of over 2500. Seven groups are in process of formation and still others are expected to form sections before the end of 1947.

Technical Sessions Featured

The Chicago conference provided nine sessions over five days with 21 technical papers. In addition, the Instrument & Regulators Division of the American Society of Mechanical Engineers met concurrently and conducted 10 sessions with 13 technical papers. Albert F. Sperry, president, Panellit Inc., Chicago, is chairman of the national meetings committee of the Instrument Society, and J. C. Peters, Leeds & Northrup Co., Philadelphia, is division chairman of the Mechanical Engineers.

In the exhibit, which occupied the entire space available in the Stevens Hotel exhibition hall, 139 exhibitors displayed instruments and allied equipment estimated to have a value of $6 million. Several government bureaus and the armed services sponsored displays. These exhibits, undoubtedly the largest exclusive showing of this kind ever assembled, incorporated the latest developments in the scientific and industrial instruments for research, analysis, control, inspection, testing and the multitude of devices, products and materials of the instrument industry serving science, commerce and industry. A substantial proportion of the instruments and equipment shown are used in the iron, steel and metalworking industries.

PAUL G. EXLINE
Newly elected president of Instrument Society of America

Attendance at the five-day conference and exhibit approached 7000. Since attendance was restricted to technicians, engineers and others having an interest in the use of instruments, the audience was a discerning one.

Paul G. Exline, section engineer, research division, Gulf Oil Corp., Pittsbugh, and secretary of the Industrial Instruments & Regulators Division, American Society of Mechanical Engineers, was elected president of the Instrument Society of America, to succeed C. O. Fairchild, consultant, Corning Glass Works, Mt. Vernon, N. Y. Two new vice presidents are F. H. Trapnell, chief instrument engineer, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., and H. C. Frost, assistant director of engineering, chemical division, Corn Products Refining Co., Argo, Ill.

Holding over as officers are First Vice President C. F. Kayan, professor of mechanical engineering, Columbia University, New York; Vice President H. H. Barnum, manufacturers representative and contracting engineer, Detroit; Treasurer H. E. Ferguson, plant testing engineer, Peoples Gas Light & Coke Co., Chicago; and Executive Secretary Richard Rimbach, 1117 Wolfendale St., Pittsburgh.

Sept. 13-17, 1948, has been selected as the date for next year's exhibition, and the place is Convention Hall, Philadelphia.

Calendar of Meetings . . .

Sept. 22-25, Association of Iron & Steel Engineers: Annual meeting, Hotel William Penn, Pittsburgh.

Sept. 23-25, American Institute of Electrical Engineers: Middle eastern district meeting, Dayton Biltmore Hotel, Dayton, O. Institute headquarters are at 33 W. 39th St., New York.

Sept. 23-26, Institute of Metals (British): 39th annual autumn meeting, Glasgow, Scotland. Institute secretary is S. C. Guillan, 4 Grosvenor Gardens, London.

Sept. 24, Navy Industrial Association: 4th annual dinner meeting, Waldorf-Astoria, New York.

Sept. 27: Symposium on Modern Metal Protection: Sponsored jointly by Cleveland sections of American Chemical Society, Electrochemical Society and American Institute of Chemical Engineers, at Hotel Carter, Cleveland.

Sept. 28-Oct. 3, American Institute of Mining & Metallurgical Engineers: Regional meeting, Denver. Institute headquarters are at 29 W. 39th St., New York.

Oct. 2-3, Gray Iron Founders' Society: 19th annual convention, Hotel Schroeder, Milwaukee. Society headquarters are at 1010 Public Square Bldg., Cleveland.

Oct. 3-4, National Association of Purchasing Agents: District No. 6 meeting, Hotel Cleveland, Cleveland. General chairman is Thomas D. Hudson.

Oct. 6-7, Packaging Machinery Manufacturers Institute: 15th annual meeting, Hotel Sheraton, Springfield, Mass. Institute headquarters are at 342 Madison Ave., New York.

Oct. 6-10, National Safety Council: National Safety Congress & Exposition, at Stevens, Congress, Palmer House and Sherman hotels, Chicago. Council headquarters are at 20 N. Wacker Dr., Chicago.

Oct. 8, American Society for Testing Materials: District meeting, Rackham Memorial Bldg., Detroit.

Oct. 9-10, Porcelain Enamel Institute: Annual meeting, Cleveland.

Oct. 15-18, Electrochemical Society: Boston Congress, Copley-Plaza Hotel. Society secretary is Colin G. Fink, 3000 Broadway, New York.

Oct. 16, American Society for Testing Materials: District meeting, Benjamin Franklin Hotel, Philadelphia.

Oct. 16-17, National Conference on Industrial Hydraulics: Sponsored by Armour Research Foundation and Graduate School of Illinois Institute of Technology. Hotel Continental, Chicago.

Oct. 18-24, American Society for Metals: 29th annual national metal congress, Chicago. Society headquarters are at 7016 Euclid Ave., Cleveland.

Oct. 20-22, Iron and Steel Division and Institute of Metals Division of AIME: Fall meeting, Hotel Stevens, Chicago. Headquarters are at 29 W. 39th St., New York.

Oct. 20-24, American Welding Society: Annual meeting, Sherman Hotel, Chicago. Society secretary is M. M. Kelly, 33 W. 39th St., New York.

Oct. 27-29, Western Division, American Mining Congress: Annual convention, El Paso, Tex. Julian D. Conover, 309 Munsey Bldg., Washington, secretary.

Oct. 30-31, Nov. 1, American Society of Tool Engineers: Fifteenth semi-annual meeting, Statler Hotel, Boston.

Nov. 2-5, National Tool & Die Manufacturers Association: Annual meeting, Benjamin Franklin Hotel, Philadelphia. Executive secretary is George S. Eaton, Union Commerce Bldg., Cleveland.

Nov. 3-7, National Electrical Manufacturers' Association: Second international lighting exposition and conference, Stevens Hotel, Chicago. Association headquarters are at 155 E. 44th St., New York.

Nov. 5-7, American Society of Body Engineers: Second annual technical convention, Rackham Memorial Bldg., Detroit. Society headquarters are at 100 Farnsworth Ave., Detroit.

Nov. 7-8, Pittsburgh Conference on X-ray and Electron Diffraction: Fifth annual meeting. General chairman is Harold Klug, Mellon Institute of Industrial Research, 4400 Fifth Ave., Pittsburgh.

Nov. 7-10, National Airport Show and Institute, Cleveland Public Auditorium, sponsored by the Air Foundation of Cleveland and the National Aeronautic Association.

Nov. 10-13, American Institute of Steel Construction: 25th annual convention, Roney Plaza Hotel, Miami Beach, Fla.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Administration expected to decide quickly whether it will request restoration of price controls and rationing should Congress be called into special session to act on plans for increased aid to Europe

WHETHER the Congress, in a contemplated fall session, will be asked to authorize restoration of price control and rationing is one of the principal questions facing the administration in its plans to furnish vastly increased aid to Europe this fall and winter.

Indications are that this question will be decided without delay because of the insistence of Secretary of State Marshall that expanded food shipments, and supplies of certain other commodities, will have to start going forward almost immediately. The White House has set Sept. 30 as its tentative deadline for freezing plans in connection with aid to Europe. There should be a decision prior to that date as to whether Congress will be called into extra session, and what requests will be made of it.

In the meantime, the President's Aid to Europe Committee, headed by W. Averill Harriman, has been exploring the overall economic situation to find out how much aid we can give. In the absence of a definite bill of particulars from the State Department no exact findings have been possible. In the hope that these particulars will be available by the last day of September, Mr. Harriman has set Oct. 3 and 4 as the dates for another, and perhaps final, conference.

Asked at one of his press conferences whether the intensified aid to Europe program will furnish further upward impetus to commodity prices, Mr. Harriman, wearing a look of deep concern, said, "Of course, that will be one of the effects." The principal need, he revealed, will be for more food. Chester C. Davis, chairman of his subcommittee on food resources, advanced as his purely personal opinion the suggestion that stepped-up food shipments to Europe would require some sort of rationing control, but whether it should be voluntary or by congressional decree, he was not prepared to say.

H. G. Batcheller, chairman of Mr. Harriman's subcommittee on capital and durable goods, told this particular press conference that the worst jam in capital goods is in heavy equipment—as heavy duty motors, large transformers, certain agricultural, textile and mining machinery and other heavy items. In many instances manufacturers of such machinery are sold three years ahead. But the situation varies, and there will be no attempt to get down to cases until exact European needs are made known.

One thing is sure, said Mr. Batcheller; our ability to furnish such items will depend in large part on our steel production. There are two ways of expanding steel production, said Mr. Batcheller. One is to get the present expansion program completed as soon as possible, in order to produce an additional 2,500,000 tons of ingots which this program will make possible. The other is to get back into production idle steelmaking facilities which have an aggregate capacity of between 5 million and 6 million tons of ingots. Various problems must be solved to get these facilities into production, but the most difficult are those incident to obtaining adequate supplies of scrap and of coal of metallurgical grade.

On one policy, Mr. Harriman stated the committee is agreed: That is, instead of shipping finished steel products to Europe, the steel should be shipped in its final fabricated form, as machinery. Under such a policy the scrap generated in fabrication would be kept here and there would be a minimum drain on the country's ferrous resources.

Former Senator Robert M. LaFollette Jr., said Mr. Harriman, is the chairman of a subcommittee which will plan the machinery by which the contemplated aid to Europe program will be handled. For example, Mr. LaFollette will recommend how the procurement assignments shall be distributed among various government agencies.

On Aug. 19, at the request of the Harriman committee, the Census Bureau sent out a letter to thousands of representative steel consumers asking them to furnish confidential data as to the size of their steel inventories on June 30, 1947. The purpose was to check the accuracy of reports that inventories in numerous cases are larger than needs require. On Sept. 8 Census sent out follow-up letters. The results to date have been inconclusive.

Being a government body, the Harriman committee is not in a position to criticize acts and policies of the administration. Therefore, it was without comment that Mr. Harriman revealed the vast size of our coal shipment to Europe. In August 4,100,000 tons of coal left our shores for Europe and the sights have been set for exporting 3,500,000 tons in October. In addition, 800,000 tons are slated to go out that month to Latin America and other destinations.

HEADS BUREAU OF MINES: Dr. James Boyd, former dean of the Colorado School of Mines, takes the oath of office as director of the Bureau of Mines, while Secretary of Interior J. A. Krug, right, looks on. Acting Chief Clerk C. C. Davison of the Interior Department is administering the oath. Behind him is Oscar L. Chapman, undersecretary

Overpayment Charges Fizzle

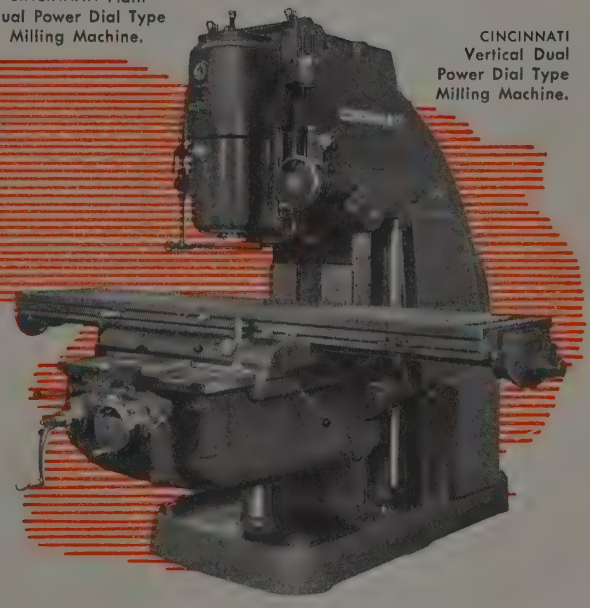
Despite a lot of threatening talk from Chairman George Bender (Rep., O.) and some members of his subcommittee of the House Executive Expenditures Committee, it is unlikely that any large num-

cutting ability and convenience of operation . . .

combined as never before in a milling machine

THE NEW CINCINNATI 50 hp DUAL POWER DIAL TYPE MILLER

CINCINNATI Plain Dual Power Dial Type Milling Machine.



CINCINNATI Vertical Dual Power Dial Type Milling Machine.

You can scarcely visualize the combination of tremendous cutting capacity and easy, convenient operation until you see these new CINCINNATI Millers in action. Following are some of the features of the new CINCINNATI Dual Power Dial Type Milling Machine.

1) Up to 50 hp drive. The caption for the picture below translates this amount of horsepower into cutting capacity.
2) Dynapoise Overarm increases cutability of the machine.
3) 100 to 1 speed range . . . 14 to 1400 rpm.
4) 240 to 1 feed range . . . ¼ to 60 inches per minute.
5) Fully automatic table cycles, with rapid traverse of 150 inches per minute.
6) Single lever selection of speeds and feeds, by power.

Details of all features and their benefits as well as complete specifications will be sent on request. Ask for catalog M-1569.

A CINCINNATI No. 5 Dual Power Plain Dial Type in action, taking a heavy down-milling cut in SAE 3145 steel. The cutter is 4" diameter, has 8 teeth, negative rake.

Speed . . . . . 219 rpm
Feed . . . . . 14½" per minute
Dimension of cut . . . 2x1¼" deep

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THE CINCINNATI MILLING MACHINE CO.

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ber of suits will be brought against war contractors to recover alleged overpayments incident to contract settlement. The recent charges of the comptroller general that many contractors defrauded the government seem to have fizzled.

The Justice Department, it is revealed, looked into 147 such cases referred by the General Accounting Office for action. Justice decided that in 93 cases there was no basis for prosecution and it dropped them. The remaining cases still are pending, but prosecution of most of them is doubtful. Certain petroleum contracts and one aircraft contract now are under closest scrutiny.

The record of accomplishment, as revealed to the Bender subcommittee, put the General Accounting Office in a rather poor light. To date, three years following enactment of the Contract Settlement Act of 1944, the General Accounting Office has audited only between 4500 and 5000 of the 318,000 terminated war contracts. On this basis, had the GAO won its battle for pre-audits in 1944, it would take something like 200 years to pay off all the terminated war contractors—not counting the cases in which the GAO found fault with the settlement claims.

At the hearings, GAO officials continue to decry the failure of Congress to hold off settlement payments until after the GAO has made its audit. Their insinuation that failure to insist on such pre-audits encourages fraud drew a joint statement from three angry former directors of the Office of Contract Settlement, Robert H. Hinckley, Roger L. Putnam and H. Chapman Rose. The comptroller general, they pointed out, never has advanced any reason "why it was more difficult to detect fraud by an audit made the day after a settlement than by an audit made the day before." They accused the comptroller general of failure to time post-audits, pointing out that such timing is strictly within his control. "The act implies the necessity for maximum speed in post-auditing," they pointed out. They also called attention to the fact that the comptroller general's recent accusation made reference to suspected rather than proved fraud. Also that when the comptroller general cited overpayments of $2,009,000 to 19 contractors, the alleged overpayments were not in excess of $788,233.41, and the rest of the $2 million included in the penalties and forfeitures to which these contractors would be subject if they were found guilty.

Nothing much, therefore, is expected to result from what was heralded in August as an exposure of widespread fraud by industry. About the only congressional action which seems likely, as a result of facts brought out at the hearings, is restoration of an 1870 law, repealed by the Contract Settlement Act of 1944. This law prohibited government contracting officers from accepting employment, within two years after leaving the government service, from contractors whose contracts they had handled for the government.

Zinc Export Licensing

A number of commodities manufactured of zinc have been removed from the Positive List of Commodities requiring validated licenses for export and placed on general license for exportation to Group K countries, according to announcement by the Office of International Trade. Included are die castings, photoengraving sheets and plates, etc.

India Plans Conservation

The newly organized government of India contemplates formulation of a strict policy of conservation and planned utilization of mineral resources according to *Indian Information*, a magazine distributed by the Indian government among Washington news correspondents.

Contrary to widespread impression, says that magazine, India is not "enormously" rich in minerals. Only iron, aluminum, magnesium, manganese, titanium and thorium ore and mica occur in plentiful supply. Otherwise India's minerals are of decidedly limited extent. It quotes an Indian government report as follows:

"A study of the list of minerals for which India has to depend largely or entirely on foreign imports indicates that India is deficient in certain minerals of strategic importance, namely tin, tungsten, lead, zinc, nickel, graphite, and the liquid fuels.

Economic Series Completed

The United States Tariff Commission, as a result of the publication of three additional reports, has completed its series on "Economic Controls and Commercial Policy in the Latin American Republics." The new reports cover El Salvador, Guatemala and Honduras, the first being available at 15 cents and the other two at 10 cents each from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

HOUSE COMMITTEE VISITS EUROPE: These members of the House Armed Services Committee are shown just before boarding a plane at National Airport in Washington for an inspection tour of Europe. Left to right: Joseph L. Pfeifer (Dem., N. Y.); Leroy Johnson (Rep., Calif.); Dewey Short (Dem., Mo.); Margaret Chase Smith (Dem., Me.); C. W. Bishop (Dem., Ill.); Gordon Canfield (Dem., N. J.); and John E. Fogarty (Rep., N. J.)

Dollar Shortage Forcing France To Cut Imports

Machinery and industrial equipment purchases to shrink. Nation produces more coal and ore

PARIS, FRANCE

DOLLAR shortage will force France to cut importations from the United States, thus following Britain's example.

Gasoline imports, almost all of which are bought for dollars, will be stopped immediately. All other dollar imports will be suspended except a few essentials previously contracted for, such as cereals, coal and fats and a few items for France's overseas territories.

In July France had planned to spend $600 million the last six months of this year. Several weeks ago this figure was brought down to $450 million and now it has been scheduled not to go further than the $293 million worth of essential imports already contracted for. This means few imports of machinery and industrial equipment and consequently a severe blow to the Monnet plan for reconversion and recovery.

Dollar Shortage Studied

This dollar shortage problem is the one that the 16 nation conference is now trying to master. The actual difficulties have led to a French austerity program the first step being the cutting of the national bread ration to 200 grams or 50 grams less than the lowest ration during the war. On the labor front a decree was published that will put France on a 48 hour week.

The bread ration is a very serious affair as the French eat more bread than any other people. Countrywide agitation among salaried workers for lower living costs and more bread spread to Paris recently when a crowd of public and private employees assembled and protested against insufficient ration, the bad quality of bread, lack of meat and milk and the constantly increasing cost of living. There were strikes against the bread ration cut and the insufficient purchasing power of wages at the Peugelt automobile factories and in some other places. These were largely led by communists.

The French government program did not meet with general approval. In order to prevent a general rise of industrial prices Premier Ramadier asked for subsidies for coal and steel, but he received little support in the Assembly, and he was obliged to limit them to coal, this subsidy being finally granted. The steel subsidy had been included in the 1947 budget for 7554 million francs. The consequence of this cancellation will be a rise in prices of about 20 per cent which will be added to the 25 per cent increase allowed last March.

LOTS OF PROP: One of the most striking aircraft on display at the British Society of Aircraft Manufacturers show at Radlett, Eng., is the "Wyvern Mark 1", a naval torpedo-fighter plane with an 8-bladed propeller. NEA photo

The economic situation is complicated, one of the causes being a catastrophic harvest. Latest estimates predicted a harvest not exceeding 3,300,300 metric tons as against 4,060,000 tons in 1946 and a yearly average for the years preceding the war of 6,230,000.

Coal production in July increased by 553,000 tons, or 16 per cent over June when the figures dropped owing to miners' strikes. Coal deliveries to France exceeded the July quota by 16 per cent, United States furnished 250,000 tons more than expected and shipments from Germany especially from the Saar also exceeded the quota by 8 per cent. The United States furnished 70 per cent of the coal imported by France in the first seven months of this year.

Extraction of iron ore from French mines increased slightly in July with 58 per cent of the 1938 average as against 51 per cent in June. Limited use and insufficient exports are holding down ore production.

The number of blast furnaces in operation rose to 68 compared with 66 in June and 81 in 1938. Pig iron production in July was 82 per cent of the 1938 figure. Steel production index reached 91 as against 90 in June. Production of rolled steel at index 91 remained at about the June level.

The production of passenger cars increased in July while truck production fell off by about 10 per cent.

	June 1947	July 1947
Passenger cars	4,775	5,090
Motor trucks	5,407	4,860
Other vehicles	323	320
		10,270

The French trade balance for July showed a deficit of $96,400,000 which represents 24.5 per cent of the total value of foreign trade for the month.

France imported from the United States various goods for a total of $73,640,000; she exported to the States $2,840,000 of her products.

American Industrialist Optimistic About Chances for Britain's Economic Recovery

ALTHOUGH the British economic crisis is grave, Britain's chances of recovery seem excellent when compared with the situation faced by France. This was the opinion of A. E. Gibson, president, Wellman Engineering Co., Cleveland, who returned recently from a two months' business trip to Great Britain and France.

Mr. Gibson went to Europe on sales representation matters for the Wellman company in Britain and in connection with 84 ship-loading cranes that the company is building for the French government, to be used at the major Atlantic and Mediterranean ports both in France and North Africa.

"I was impressed with the spirit of the British people and the lack of it with the French," he said.

Malnutrition is bad in France, he indicated, where this plus a general feeling of hopelessness contribute to pathetic production records. In the Wellman executive's opinion, the French morale is very poor. "This made as alarming an impression upon me as anything I saw during my entire trip," he declared.

Added to all this, he went on, there seems to be no incentive in France for production or mechanization because the government appears to be engaged in WPA-like projects to make as many jobs as possible to prevent unemployment. He also described how mechanization is curtailed by the myriad of rules and regulations concerning labor-saving machinery that are enforced by the powerful French unions.

Employers' Aid To Handicapped Gets Attention

Survey of 109 companies shows work performance ranks equally with that of non-handicapped

UP TO this year a relatively small number of manufacturers have been in the spotlight for their achievements in training handicapped men and women and putting them on steady jobs within their capacity.

Companies that have figured in the discussions to date include mainly International Harvester Co., Carnegie-Illinois Steel Corp., Ford Motor Co., A-C Spark Plug Division of General Motors Corp., Westinghouse Electric Corp. and Northrop Aircraft Inc.

This situation probably will change and a large number of additional employers given public recognition in connection with observance of this year's National Employ the Physically Handicapped Week which is scheduled to begin Oct. 5. The committee in charge has initiated action whereby radio broadcasters and newspaper and magazine representatives will be given entree at plants where handicapped persons are at work. As a result, it is expected, there will be a lot of publicity for the employers who have contributed to this good cause.

Drive Started in 1945

Under Public Law 176, the first National Employ the Physically Handicapped Week was held in 1945. In the drive put on that year by the United States Employment Service, 13,439 handicapped persons, including 8141 veterans of the armed services, were put to work. In the 1946 drive 29,439, including 19,200 veterans, were placed. This year, it is hoped, jobs for many more will be found.

Recently, on behalf of the Veterans Administration, the Bureau of Labor Statistics conducted a survey among 109 companies that employ some 11,000 handicapped persons. The result was of a positive character; the handicapped workers give just as good a performance as non-handicapped in the same jobs. On the other hand, the handicapped have considerably lower turnover and absentee records than the non-handicapped.

Among informed government men, there is a belief that the number of handicapped men and women of adult age in the country number in the neighborhood of 23 million. Whether this figure is anywhere near correct nobody knows. But it is certain that the number is large. The training and employment of the handicapped in jobs for which they are suited is seen as a sure way of increasing the country's productive power, of enlarging general purchasing power, and of improving the scale of living.

Seven-Months Payrolls Exceed Total for 1940

Steel industry payrolls for workers directly engaged in the production and sale of iron and steel products for the first seven months of 1947 exceeded the payroll for the entire year 1940, according to the American Iron & Steel Institute. The 7-months total was $1,121,808,000.

Total wages paid by the steel industry during July dipped from the June level, reflecting reduced operations largely as a result of idleness at the coal mines in early July. Thus, total wages and salaries paid to steelworkers during July amounted to $163,166,000, compared with the June total of $167,625,000.

Average hours worked by hourly, piecework and tonnage employees in July was 35.9 hours, compared with 38.1 hours weekly in June.

Total employment in the industry amounted to 623,400 persons in July, slightly higher than the 622,600 employed in June.

The average hourly wage for July for wage earners amounted to $1.539, compared with $1.547 for June and $1.351 in July, 1946.

Employment and payroll data for the entire industry are based upon actual reports for 120 companies representing over 93 per cent of the industry. All these figures exclude wages and salaries of workers of steel companies engaged in activities other than iron and steelmaking.

Unions Claim Membership Of 15 Million Workers

Labor union membership at present numbers about 15 million workers in the United States and Canada, somewhat fewer than 500,000 being in the latter country, according to the Department of Labor.

The figures were reported by the various unions and, consequently, may be regarded as maximum.

American Federation of Labor reported its affiliates have more than 7,500,000 members, while Congress of Industrial Organizations unions reported approximately 6 million. Other unions reported in the neighborhood of 1,750,000 members. Total union membership, says the department, numbered less than 3 million in 1933.

Bliss Expects Demand for Its Products To Continue

E. W. Bliss Co., Detroit, anticipates a demand for its products, mechanical and hydraulic heavy machinery for metalworking, rolling mills and can-making, for some time to come, Marshall Smith, president, has reported.

Mr. Smith stated that the backlog at present totaled $21 million, compared with $28 million at the start of the year. He stressed that this did not reflect a dropping off in bookings, but rather a stepping up in production. Bookings are running at about the rate of last year's billings.

Mr. Smith also predicted that earnings for the last half of this year would be substantially at the rate reported for the first six months of 1947. The company showed a net profit of $1,611,869 for the first half.

Sworn in For Third Term on U.S. Trade Commission

William A. Ayres was sworn in for a third term as a member of the Federal Trade Commission earlier this month. The new term, for seven years, begins Sept. 26.

On June 26 President Truman reappointed Mr. Ayres for a third term, and he was confirmed unanimously by the Senate on July 23. Commissioner Ayres, a Democrat whose legal residence is in Wichita, Kans., was first appointed to the commission in 1934 by President Roosevelt who also reappointed him in 1940. Before his appointment to the commission, Mr. Ayres had been a member of the House of Representatives for 18 years, serving from 1915 to 1921 and 1923 to 1934.

Continued Heavy Demand Reported by A. O. Smith

A. O. Smith Corp., Milwaukee, reports that demand for its major products, including tubular products, auto frames, water heaters and process and pressure vessels, far exceeds supply, with deliveries for some tubular items extending into 1951.

The company has budgeted about $11 million for plant expansion and improvements since the close of the war, and has spent all but about $1,500,000 of this amount. Largest single project in this program is the $4,500,000 Kankakee, Ill., plant where home water heaters are being produced.

Students, Teachers Leave Summer Jobs in Industry as Schools Reopen

Withdrawal to cause little difficulty in steel and metalworking plants, as labor supply generally is adequate. Temporary workers praised by management for performance. Served to balance employment during vacation periods

WITHDRAWAL of thousands of college and high school students and teachers from the steel and metalworking plants where they have been working during the summer months will cause little hardship in the industry.

Steel and metalworking labor supply in most centers is fairly adequate, except in highly skilled classifications, a survey by STEEL's editors indicates, and the loss of teachers and students as autumn school terms start will not cause any diminution of activity. A few exceptions are noted where the labor supply is short. In the Youngstown, O., district, the labor shortage is reported to be more critical than during the war and the loss of 2000 summer workers is felt keenly. Cincinnati metalworking shops and foundries report an acute shortage.

Metalworking executives generally express satisfaction with the performance of the summer employees recruited from the schools. Their employment served to fill in the gaps made by vacations for regular employees where a staggered vacation plan is used. Vacation gaps have been increased by a general liberalization of vacation schedules.

Performed Many Jobs

The summer workers performed many jobs, principally clerical, laboring, plant protection and inspection. Instructors from vocational schools often were placed in jobs requiring higher skills.

Carnegie-Illinois Steel Corp. has initiated a supervised training program for college undergraduates. This is designed to encourage their return in succeeding summers and eventual full time employment after graduation. Several hundred such students were employed in the company's mills during the past few months and the company reports the plan is working out well. Several other companies have similar programs.

More college students were available for summer employment this year than during the past several for the reason that most schools have abandoned the year-round speed-up schedules and returned to normal schedules with summer vacations. Many members and aspirants for college football teams seek to condition themselves for football through labor in metalworking plants. Metalworking management has found productivity of these men to be above average.

Fewer plants are employing youths under 18 years of age than formerly. During the war, legal restrictions on the employment of these youths were sometimes winked at due to the acute manpower shortage. Now, however, the metalworking companies are able to employ more mature persons and the youngsters find employment in the service industries.

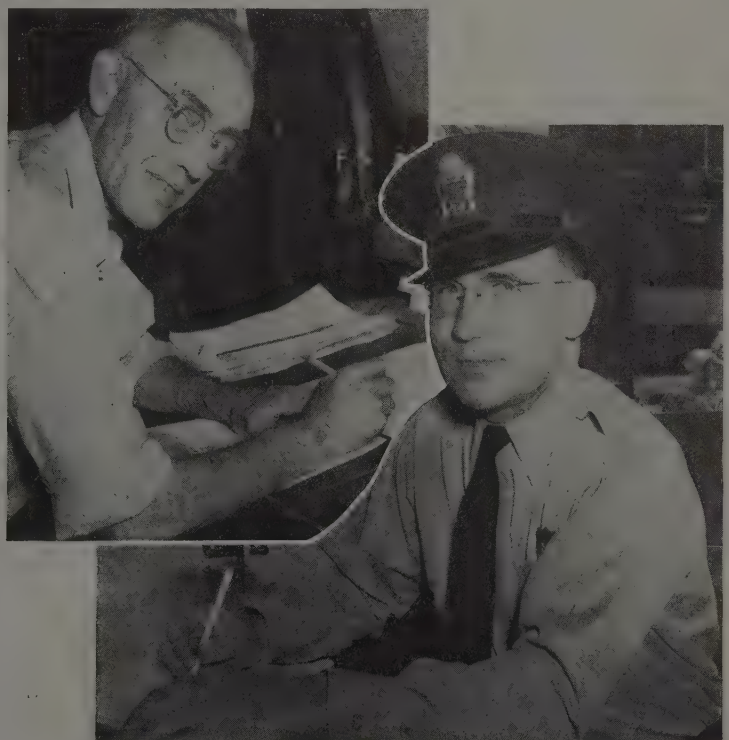
A year ago, fairly large numbers of teachers were abandoning their schools for the better paying jobs in industry. Salary increases for teachers now have lessened this trend.

With a few exceptions, steel and metalworking companies now are able to fill their labor requirements. Many areas report a surplus of fairly well trained workers who gained their experience during the war. The return of veterans, plus frequent curtailments due to shortages of materials, has served to provide an adequate supply of workers.

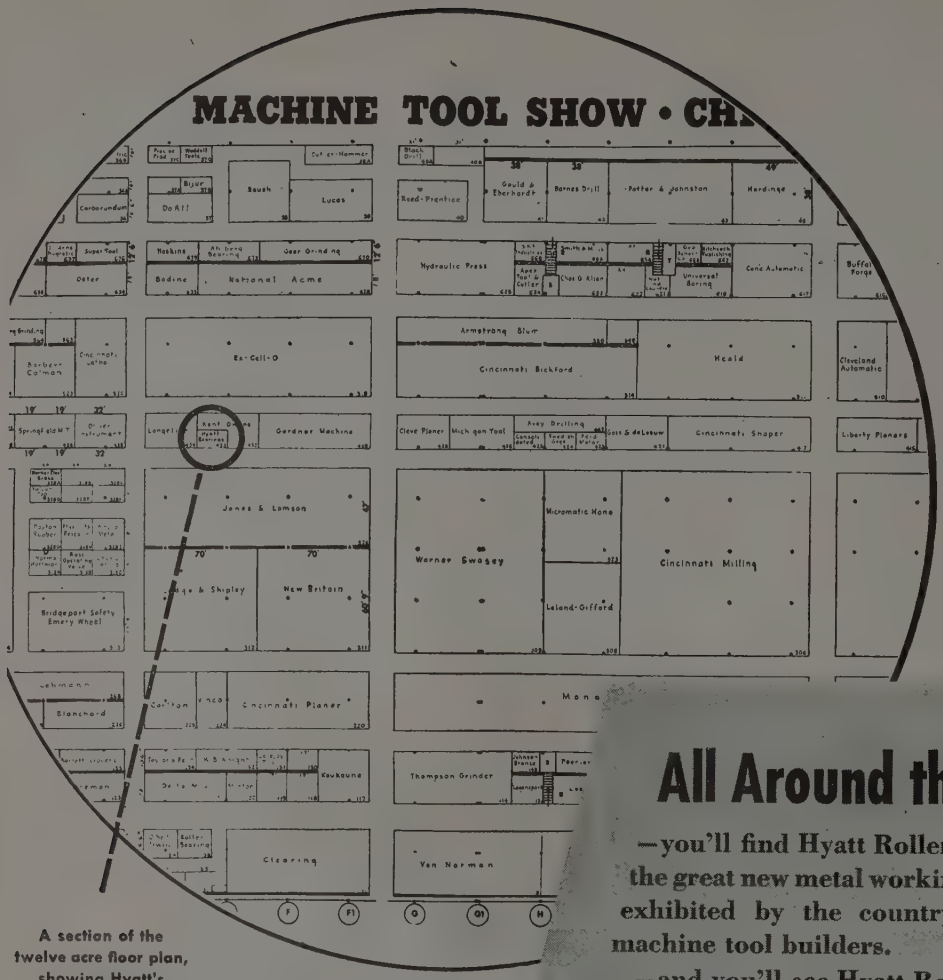
The exceptions generally are in the more highly skilled job classifications. Bricklayers, electricians and other construction workers often are scarce. Union restrictions on employment of any but union card holders have discouraged the employment of temporary workers on these jobs.

Revising Labor Bulletins

Due to provisions of the Portal-to-Portal Act, all bulletins interpreting the Fair Labor Standards Act and its administration are being revised by the Labor Department's Wage & Hour Division. Four revisions so far have been published—but they do not reveal any significant changes. One is a revision of the bulletin dealing with general coverage under the Fair Labor Standards Act as amended by the Portal-to-Portal Act. The other three deal with application of the law to farmers' co-operatives, the forestry and lumbering industry, and the exemption provisions for seamen. But others in preparation, states Administrator William R. McComb, will show significant changes; they will deal with problems such as those concerned with hours worked, and will merit careful study by personnel men and other interested executives.



Two high school teachers who have returned to the classroom after spending the summer working in Youngstown Sheet & Tube Co. plants. Upper left, John McDougall, checker in the cold strip department; lower right, Lester E. Held, property protection department



A section of the twelve acre floor plan, showing Hyatt's location at

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—and you'll *see* Hyatt Roller Bearings on display at the Hyatt Booth, No. 433.

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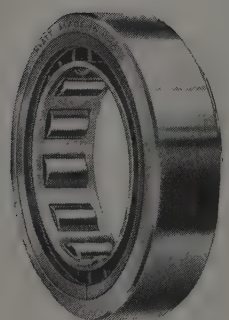

HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Ford purchasing department reorganization brings many beneficial changes in procurement of $700 million worth of materials, parts, supplies and equipment. Commodity research department set up to aid buyers

DETROIT

GENERAL overhaul of the purchasing department of Ford Motor Co. which last year alone placed orders for over $700 million worth of materials, parts, supplies and equipment, has been under way for over a year, and a progress report on the reconstruction was presented before the Purchasing Agents Association in Chicago recently by the chief carpenter on the job, Albert J. Browning, vice president and director of purchases.

At the start, in June, 1946, an outside management consulting firm was called in to survey the entire purchasing picture and this group quickly determined a number of deficiencies in the organization.

First there were too many people reporting solely to the director—ten buying divisions, three staff and service divisions and two management assistants.

Second, similar items were not being grouped for procurement by one buying department, resulting in duplication of effort and information.

Third, there was lack of co-ordination between the service and staff departments which meant failure to provide the necessary services to the buying group.

Fourth, there was a breakdown in communicating information on basic policy and control methods.

Lacked Time for Planning

Fifth, buyers had insufficient time to devote to forward planning and to analyzing their current work because they were spending more than half their time on detail and office routine.

Sixth, there were many well-qualified men with needed knowledge and experience who were misassigned, and also important areas where technically qualified personnel was lacking.

Seventh, many procedures were cumbersome and out-of-date, requiring much unnecessary paper work. Nearly all branch plant purchases, for example, cleared through the home office and some carried six or seven signatures for relatively small local buys.

These appear to be major flaws in a purchasing organization the size of the one at Ford, which over the years had gained the reputation among "peddlers" of being a pretty tough and cagey bunch. At any rate, steps were immediately taken to correct the trouble. To wit:

1. A commodity research department was established to make studies and provide both short-term and long-range information on basic commodities such as steel, copper, lead, zinc and the like.

Automobile Production

Passenger Cars and Trucks—U. S.

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	441,793	140,738
April	449,388	248,108
May	390,629	247,620
June	418,919	216,637
July	396,932	331,100
August	360,221*	359,111
September		342,969
October		410,510
November		380,664
December		380,908
12 ms.		3,268,456

* Preliminary.

Estimates for week ended:		
Aug. 30	88,098	74,960
Sept. 6	83,444	72,535
Sept. 13	109,123	88,888
Sept. 20	110,000	80,826

2. A purchase analysis department was set up to help buying departments on product and price analysis. This work includes the compilation of data on price and cost trends and analysis, information about the financial position of suppliers, analysis of products and manufacturing processes with a view to aiding buyers and suppliers in reducing costs without reducing profits below a reasonable level, preparation of information about cost accounting methods, and making analyses of parts and attemping to simplify and substitute less critical materials.

3. An administrative control department was assigned the job of providing control data and reports and assisting in improving organization and methods on a continuing basis.

4. A central follow-up department was given the task of scheduling, releasing and following up shipments by suppliers to branch plants.

5. A procurement services department took over the handling of the flow of papers and materials from other company units, to act as clearing point for exchange of information and to provide normal office services for purchasing.

6. The management and supervisory load on the purchasing director was divided by providing for two purchasing agents to co-ordinate buying groups—one for production parts and one for nonproduction materials. Then the ten buying divisions were condensed into seven departments and items reassigned into a more logical grouping. Each department head was given a small staff of administrative personnel and purchase analysts to assist him and the buyers.

There is the framework of the new Ford purchasing organization and, based on the number of former General Motors administrative personnel now on the Rouge payroll, there is more than a suspicion the new structure closely parallels that of GM.

Surveying the results of a year's operations, Mr. Browning concludes his commodity research department has done a good job. It has kept buyers up to date on commodity trends, both as to supply and price on a short and long-term basis. Formerly, buyers used such information as they could obtain from perusal of newspapers and similar sources. Now they receive a comprehensive analysis of material and information gathered from a variety of sources and presented in usable form.

Browning admits the commodity research men are not right all the time, but their advice has proved valuable and helpful. They have just completed another study of the steel outlook which indicates steel supply could be tight for some time to come, so Ford buyers have been working closely with suppliers to develop interim substitutes. For example, aluminum has been substituted for steel in rubber-covered running boards, at a lower cost, a saving of 18 lb of steel per car, and a reduction in car weight of 15 lb. Switching of headlamp housings from steel to aluminum provided rustproof housings and saved 3 lb of steel per car. Further substitutions point to the eventual saving of 200 lb of steel per car, thereby permitting production of about 100,000 more cars per year from the present steel supply—if the changes can be successfully adapted to manufacturing.

Some of the proposed substitutions are impractical from a parts cost standpoint

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CHECK IN HAND: Arnold Tucker, president of Tucker Corp., Chicago, accepts a check for $15,007,000 from Floyd D. Cerf, right, underwriter of the corporation's common stock issue. The check consistutes a green light for Tucker's venture into the manufacture of his radically different automobile. NEA photo

and would immediately revert to steel once it becomes plentiful.

The purchase analysis department has proved valuable for the service it renders to Ford buyers in the form of analyses of vendors' operations, including the review and interpretation of financial statements and related operating data. An example of how this works is in connection with the request from a supplier for a substantial price increase several months ago. Analysis of this supplier's operations as compared with those of a second supplier—a competitor—showed an unfavorable profit for the first company, although the efficiency of the two companies was known to be comparable. Investigation disclosed that the first supplier was incurring losses in operations other than production for Ford. The second supplier states he was planning no price increase and was given a larger share of Ford business; shortly thereafter the first company voluntarily withdrew its price increase and agreed to hold prices for the balance of the year. Estimated saving from this negotiation ran around $300,000 a year.

Continuous studies of cost and price relationships between items manufactured by Ford and those bought on the outside are in process to assist buyers in negotiations with suppliers, in determining the validity of prices quoted, and to assist suppliers by pointing up elements of costs which are in excess of Ford costs. Studies of new-type products are being made to ascertain whether or not their adoption will result in cost savings. An example cited by Browning is a study of the "speed nut" type of fastener, which served as a guide to "decisions which will result in savings to the company in excess of $3 million a year."

Another unusual analysis of a price pattern dealt with quotations on a steering gear housing from a certain source. Investigation developed the fact the manufacturer was paying 98 cents for a rough malleable casting which Ford was buying for 63 cents. Arrangements were made for the supplier to buy the castings at the Ford price.

A comparison of material costs for steel wheel assemblies and of steel blank sizes showed a Ford plant was using heavier stock than a supplier used for the same part. By changing to the lighter gage, Ford saved 3 cents per wheel. A modification of paint spraying technique saved another 1 cent, and the supplier has suggested a design change on the rim which has been approved by Ford engineering and will bring an estimated annual savings of $64,000.

A simple change in design of the 1947 model steering wheel cut the price 19 cents per wheel and gave a more attractive part. Elimination of two slots on the hand crank ratchet saved 3 cents per car. Browning estimates studies of this sort will save the company a total of at least $10 million a year.

Application of a firm policy of working closely with suppliers "begins at the reception lobby and continues from that point." Ford purchasing department has no "buying hours" and unless a buyer is tied up with another supplier, a visitor does not wait. If what he has to offer cannot be used, he is told why and, it is hoped, leaves with a better feeling for the company. If he has something of interest, the buyer stays with him, arranges for tests and for contact with engineering, manufacturing, sales or other divisions of the Ford company.

Browning is not satisfied his purchasing reorganization job is finished—far from it. He feels paper work and record-keeping can be improved and simplified, commodity research and purchase analysis techniques can be bettered and used to greater advantage, and personnel can be appraised better and special abilities used more fully. As a matter of fact, on the latter score, a full-scale buyer development program has been started within recent weeks.

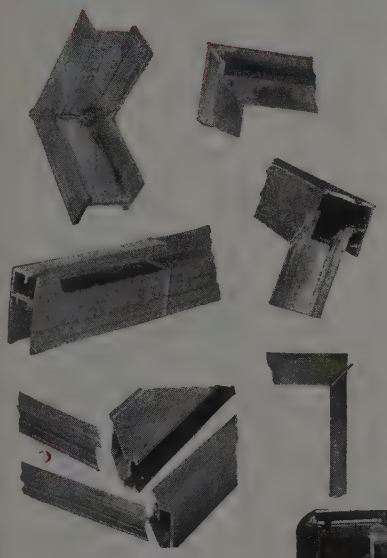
Offers Incentive System

Studebaker has offerd an incentive system to its 14,000 employees, under terms of which they could earn a 20 per cent bonus if hourly production of passenger cars were boosted 12 per cent and of trucks 17 per cent. The proposal was stated to be unacceptable to officers of the union local at the plant, but was to be submitted to a vote of employees. Management of the company stated the offer would be withdrawn at once if quick approval was not forthcoming.

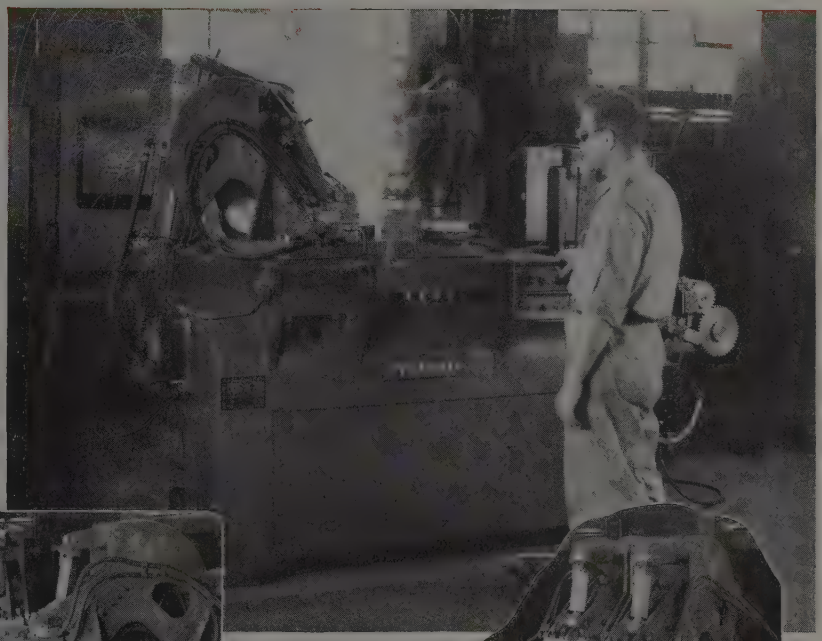
New Connecting Rod Bearing

Automotive engine specialists are studying with interest a new type of connecting rod bearing with high load-carrying characteristics and comparatively low cost. It is a steel-backed type, containing a thin copper-lead bearing alloy plated with silver and indium. By manufacturing the bearing in strip form Cleveland Graphite Bronze Co. has been able to trim the cost down to where it has attractive automotive possibilities, particularly when engines with stepped-up compression ratios come into production.

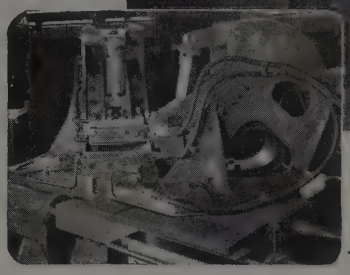
Flash-Welded Aluminum (or Steel) Sash Hits New Production High on Federal Welder



Note that in many cases the two sections mitre joined are not alike either in size or shape.

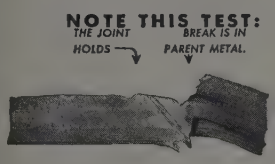


It's a Federal F4 Flash Welder



Flash Butt Welding Setup ▶

◀ Flash Mitre Welding Setup



THE manufacture of strong, light-weight metal sash received a great impetus when Federal pioneered development of resistance welders to automatically weld butt or mitre joints of intricate cross-sections.

It now takes about one second of welding time to flash a mitre joint stronger than the parent metal on the Federal F4 Flash Welder shown above. It is typical of present day equipment which is helping fabricators of aluminum sash, frames and doors to attain a new high production output. This "four-in-one" machine, equipped with combination cams (a new feature) is adaptable to either aluminum or steel sash, with simple changes of gears and tap settings. In addition, it welds either mitre or butt joints. Alternate setups are made simply by rotating the clamp assemblies as shown in the smaller illustrations.

A few of the many special sections now being production welded in aluminum are shown at left. Production rates vary with the cross-section and method of loading, but all are in high output range that makes other methods unprofitable by comparison.

This, as the evidence shows, is the modern way to make metal sash with rigid unbreakable joints, which finish nicely. It is typical of the short-cutting, cost-saving methods possible in all sorts of metal fabrication with the use of Federal resistance welding. It's time to find out how this applies to YOUR production.

THE Federal MACHINE AND WELDER CO.

SUBSIDIARIES

Sciaky and Adams — SPECIAL HIGH PRECISION MACHINES

The Warren City Mfg. Co., Warren — WARCO PRESSES and PRESS BRAKES

497 DANA AVE., WARREN, OHIO

MEMBER RESISTANCE WELDER MANUFACTURERS' ASSOCIATION RWMA

Celebrate Silver Anniversary at Chevrolet Plant

Automotive assembly facility at Janesville, Wis., has produced 1,830,000 cars and trucks in 25 years

JANESVILLE, Wis., assembly plant of Chevrolet Motor Division, General Motors Corp., recently celebrated its silver anniversary. Included in program arranged by R. W. Podlesak, plant manager, was an open house which was attended by several thousand residents of the Janesville area.

In 25 years of operation the plant has produced more than 1,830,000 cars and trucks, most of which have been distributed in the midwestern states. Constructed in 1919 on a 122-acre site by Samson Tractor Co., the property was acquired by Chevrolet in 1922 and converted into an automotive assembly plant.

Since its acquisition, according to E. S. Wellock, assistant manufacturing manager in charge of all Chevrolet assembly plants, the unit has been enlarged three times, and today embraces 802,908 sq ft, including space occupied by Fisher Body Division. An addition to the latter's office building is now being completed, and an extension is being added to the assembly plant to provide more storage space and better conditions for workers.

The Janesville plant has a capacity of 520 cars and trucks every eight hours, but present operating level is restricted by materials shortages, principally sheet steel.

LOCOMOTIVE LAUNDRY: This semiautomatic washing machine will give the Pennsylvania Railroad's electric locomotives a bath in 15 minutes, compared with the nearly three hours previously required for hand cleaning. Aided by jets of steam, oxalic acid and water, the revolving brushes clean both sides and running gear. Machine was designed and built by Whiting Corp., Harvey, Ill., and is installed in the railroad's Sunnyside yard in New York

J. & L. Awards Contract for Mine Modernization Project

Jones & Laughlin Steel Corp., Pittsburgh, recently awarded a general contract to F. H. McGraw Co., New York, for consolidation of coal mining operations at Vesta Nos. 4 and 5 mines in Washington County, Pa., and construction of a three-part coal operation and coal cleaning plant. Once the entire program is completed after an estimated two years, the equipment will produce 18,000 tons of washed coal per day.

General Electric Opens Coshocton Plastics Plant

Termed the largest plant of its kind in the country, the new General Electric plastics manufacturing works at Coshocton, O., which officially opened a week ago, more than doubles the company's capacity for producing laminated plastics products.

Designed and built by Austin Co., Cleveland, it comprises three buildings with the principal manufacturing building covering 235,820 square feet. Other buildings include a power house and a plant for making plastics varnishes. H-section trusses, which were shop and field welded, were used throughout the framework.

Use of 51-ft trusses in combination with 41-ft jack trusses throughout all portions of the building makes it possible to accommodate all production departments in an integrated straight-line layout. Added flexibility is provided by use of movable steel partitions.

Air-conditioning and special wall construction were employed to maintain close control of temperature and humidity required in the functional storage and build-up departments, prepared material storage and treated material roll storage departments.

Largest press in the plant is a 5000 ton unit capable of producing laminated sheets 50 x 100 in. Another giant press forms sheets 30 x 110 in. while other presses range from 10 to 1800 tons.

Dearborn Motors Purchases Iowa Farm Equipment Firm

Dearborn Motors Corp., Detroit, marketing organization for Ford tractors and Dearborn farm equipment, has purchased Wood Bros. Inc., Des Moines, Iowa, manufacturer of farm equipment. Purchase price was not disclosed.

Frank R. Pierce, president of Dearborn, will succeed W. Harold Brenton as president of Wood Bros. Other personnel and policies will remain unchanged, Mr. Pierce said. The Iowa firm is currently producing 75 corn pickers daily.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Strong Steam Specialty Mfg. Co., Cleveland, has been formed as a subsidiary of Strong, Carlisle & Hammond Co. to operate the Steam Specialty Division of Ajax Iron Works, Corry, Pa., which the new corporation recently acquired.

—o—

National Steel Corp., Pittsburgh, plans to open a completely mechanized coal mine near Morgantown, W. Va., to produce metallurgical coal for Weirton Steel Co., Weirton, W. Va., a subsidiary. Cost of buildings and equipment is estimated at $5 million.

—o—

Cabl-Ox Corp., Chicago, has been newly formed at 6 N. Michigan Ave. to manufacture and merchandise the Cabl-Ox wire rope clamp, vise and allied wire rope products.

—o—

Pittsburgh Corning Corp., Pittsburgh, announces it will resume manufacture of solid glass block on or after Oct. 1. The product was discontinued during the war.

—o—

Beech Aircraft Corp., Wichita, Kans., has redesigned control surfaces on its line of personal planes for an all-magnesium structure. The flaps, ailerons and elevators were formerly of wood and fabric construction.

—o—

Henry Disston & Sons Inc., Philadelphia has appointed Steel Distributors Inc., Philadelphia, as distributor for the Disston line of tool steels in Philadelphia and surrounding areas.

—o—

Alco Refrigeration Co., Cleveland, distributor of compressors and air conditioning equipment, has changed its name to Alco Refrigeration Sales & Service Inc.

—o—

C. G. Hussey & Co., warehousing firm for copper, brass and nonferrous metals and supplies, has moved to 3900 N. Elston Ave., Chicago.

—o—

Spang-Chalfant Division, National Supply Co., Pittsburgh, has awarded a contract to Rust Furnace Co., Pittsburgh, for construction at Ambridge, Pa., of a continuous bloom heating furnace with a capacity of 60 tons an hour. Spang-Chalfant makes tubular products.

—o—

Westinghouse Electric Corp., Pittsburgh, will soon install the highest rated single-phase transformer it has ever built at Snohomish substation of the Bonneville Power Administration near Everett, Wash. The transformer has a top output of 83,333 kva.

—o—

Petrol Terminal Corp., Philadelphia, has purchased for $3,250,000 an oil refinery in Texas City, Tex., operated during the war by American Liberty Oil Co. The plant produced 100,000 barrels of gasoline per month during the war.

—o—

Pullman-Standard Car Mfg. Co., Chicago, announces that, with new orders for 3600 freight cars, the company's Haskell & Barker plant at Michigan City, Ind., now has 9300 cars on order.

—o—

Liquid Carbonic Corp., Chicago, has completed an oxygen manufacturing plant in Buffalo which will supply oxygen to users in the medical and industrial fields in Buffalo and vicinity. J. J. Kelly is in charge of the Buffalo branch.

—o—

Lakey Foundry & Machine Co., Muskegon, Mich., has purchased for $88,952 surplus service facilities built by the government at the company's Muskegon plant at an original cost of $284,503.

—o—

Bausch & Lomb Optical Co., Rochester, N. Y., reports it plans to establish a small manufacturing plant in Canada, probably at Midland, Ont. The facility will make lenses for sale in Canada only.

—o—

War Assets Administration is offering for sale or lease an airplane plant in Wichita, Kans., built by the government at a reported cost of $29 million and operated during the war by Boeing Airplane Co. Covering a land area of 185 acres, the plant includes 10 main buildings.

—o—

Marmon-Herrington Co. Inc., Indianapolis, manufacturer of trolley coaches, trucks and other vehicles, has introduced a 48-passenger trackless trolley coach. The new model weighs 18,000 pounds and uses aluminum and steel alloy construction.

—o—

Aerco Corp., Hollydale, Calif., subsidiary of Adel Precision Products Corp., this month began production of a general purpose farm tractor. The unit is designed for use on farms of 10 to 100 acres.

—o—

War Assets Administration is offering for sale or lease a magnesium metal and alloys plant in Painesville, O., which has a rated capacity of 36 million pounds per year. The facility was operated during the war by Diamond Magnesium Co.

—o—

Dravo Corp., Pittsburgh, engineering and construction firm and designer and builder of industrial and power plant machinery, recently honored Thomas E. Doyle in recognition of his 54 years' service as an employee and officer of the company. Firm also inducted 87 new members into its veterans' organization which now has a membership of 325.

—o—

Skill-Kraft Homes Inc., manufacturer of prefabricated houses, has leased a portion of the surplus Goodyear plant No. 536, Akron, for 11 months beginning Oct. 1. Lease provides for the use of 50,800 sq ft of space at a rental of 41 cents per sq ft for half and 10 cents per sq ft for the other half, payable monthly.

—o—

E. W. Bliss Co., Detroit, maker of metalworking machinery, presses, dies, rolling mills and can-making equipment, has transferred its sales offices for the New York metropolitan district and for export from Brooklyn to 19 E. 47th St., New York.

—o—

Wheeling Machine Products Co., Wheeling, W. Va., manufacturer of steel tubing, pipe couplings and pipe nipples, has moved to its new plant on U. S. Route 40.

—o—

Independent Pneumatic Tool Co., Chicago, manufacturer of pneumatic tools, hoists, drills and contractors' tools, in the next 30 days plans to occupy its $1 million plant addition at Aurora, Ill.

—o—

Hydro-Line Mfg. Co., Rockford, Ill., manufacturer of air and hydraulic cylinders, special machinery and equipment, has named Hydraulic Straightening & Mfg. Co., Los Angeles, as its sales representative in southern California and Arizona.

—o—

United Aluminum Castings Co., Cleveland, producer of aluminum and aluminum alloy castings, has moved to 3471 W. 140th St.

—o—

War Assets Administration is offering for sale or lease an aircraft parts plant in Southington, Conn., formerly operated by United Aircraft Co. The plant comprises a 40-acre tract, a main factory and office building and eight other structures.

—o—

Standard Oil Co. of California, San Francisco, has purchased for $6 million a surplus 100-octane gasoline refinery in Richmond, Calif.

The Business Trend

Jump in Auto Output Sparks Industrial Pace

A NEW postwar peak in automobile manufacture offset a drop in steel ingot output and permitted the industrial production rate in the week ended Sept. 13 to rise substantially. Also contributing to the gain were improvements in railroad car loadings and electricity distribution, the latter again reaching a new all-time peak by ascending that week to 5,053,300,000 kilowatthours.

Net effect of the changes from the preceding week was a 7-point gain that placed STEEL's industrial production index for the week ended Sept. 13 at 160 per cent of the 1936-1939 average.

AUTOS—In setting a new postwar record, auto production in the week ended Sept. 13 reached 109,123 passenger cars, trucks and busses, compared with 83,444 in the preceding week. Previous postwar peak had been 108,472 units in the week ended Mar. 22.

STEEL—Settlement of a wildcat railroad strike at Pittsburgh is permitting a recovery in steel ingot production, which, because of the strike, fell in the week ended Sept. 13 to 82 per cent of capacity, lowest rate since the Fourth of July holiday week. The loss of production aggravates the supply-demand situation in steel, particularly in the flat-rolled products.

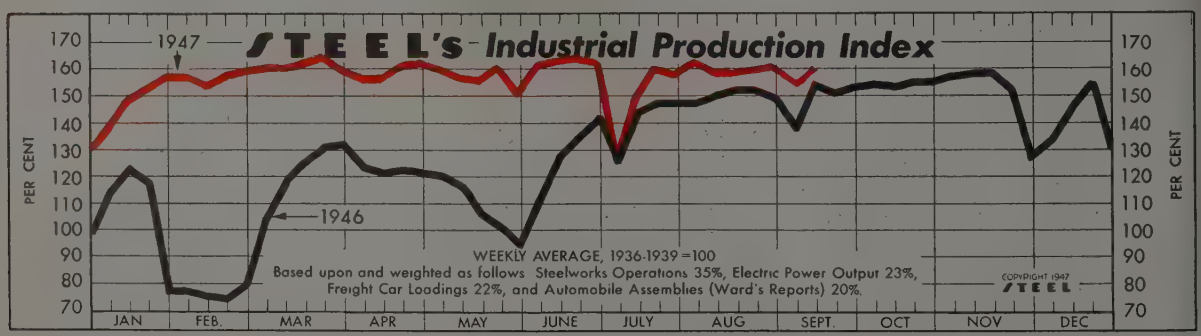
COAL—Effect of Labor Day was to cut bituminous coal production to 10,640,000 net tons in the week ended Sept. 6. In the preceding week, output had totaled 12,030,000 tons, one of the best weeks since the miners' new wage contract became effective.

PRICES—Steady advances in prices pushed the Bureau of Labor Statistics wholesale price index for the week ended Sept. 6 up 0.9 of a point over the preceding week's level. Now at 154.9 per cent of the 1926 average, the index is 27 per cent above a year ago and only seven per cent below the all-time peak of May, 1920.

WAGES—Reflecting the inflationary movement, average hourly earnings for all manufacturing industries rose in July to 123.4 cents from June's 122.7 cents. However, the July increase in hourly earnings represented a lessening in the rate of gain compared with previous months this year, the Bureau of Labor Statistics said.

CONSTRUCTION—Expenditures and employment in the construction field rose to new postwar peaks in August, according to the Bureau of Labor Statistics. Expenditures totaled $1.4 billion, compared with $1.3 billion in July, and contractors employed 1,948,000 men, a 14 per cent rise over August, 1946.

CASTINGS—Work stoppages, vacations, hot weather and continued tightness in the steel supply cut July shipments of steel castings to 116,956 tons, 16 per cent below the June movement of 139,031 tons. Meanwhile, new orders were received in sufficient volume that even though there had been no drop in shipments the order backlog would have shown a gain. At the end of July, unfilled orders totaled 473,923 tons, compared with 445,475 tons at the end of June.



The Index (see chart above): Latest Week (preliminary) 160 Previous Week 153 Month Ago 158 Year Ago 154

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	82.0	93.0	94.0	89.5
Electric Power Distributed (million kilowatt hours)	5,053	4,721	4,923	4,521
Bituminous Coal Production (daily av.—1000 tons)	1,773	2,005	1,968	1,888
Petroleum Production (daily av.—1000 bbl.)	5,217	5,173	5,159	4,773
Construction Volume (ENR—Unit $1,000,000)	$146.2	$122.8	$57.4	$86.2
Automobile and Truck Output (Ward's—number units)	109,123	83,444	83,501	88,888

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

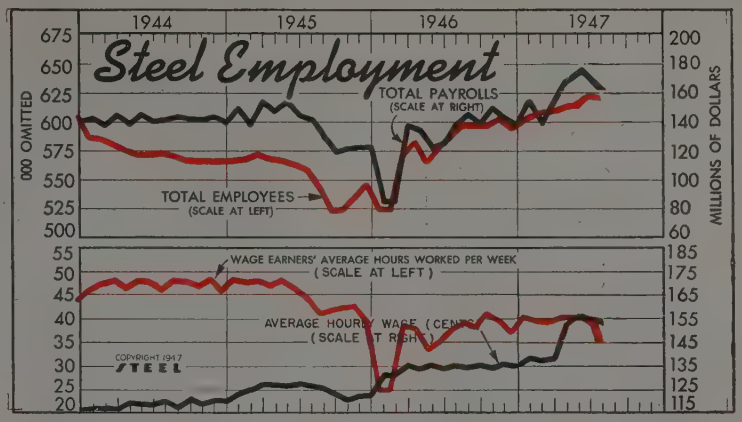
TRADE				
Freight Carloadings (unit—1000 cars)	915†	809	906	907
Business Failures (Dun & Bradstreet, number)	75	60	78	31
Money in Circulation (in millions of dollars)‡	$28,742	$28,749	$28,223	$28,499
Department Store Sales (change from like wk. a yr. ago)‡	None	—1%	—2%	+49%

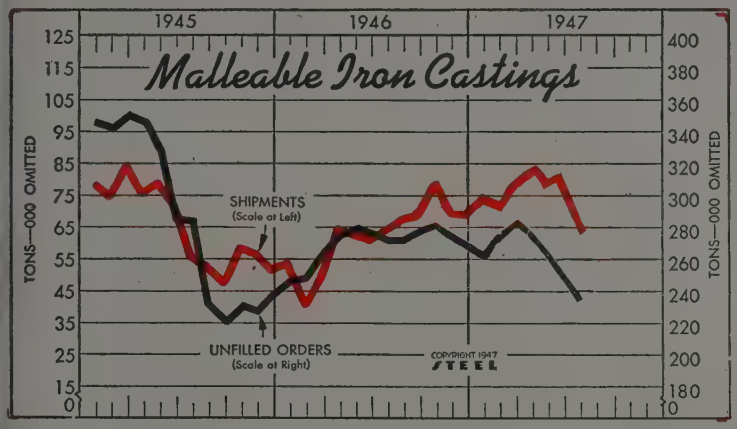
† Preliminary. ‡ Federal Reserve Board.

Steel Employment

	Employees† (000)		Total Payrolls (millions)		Hourly Wage† (cents)	
	1947	1946	1947	1946	1947	1946
Jan.*	601	522	$155.8	$84.9	138.1	131.4
Feb.*	607	522	139.5	84.9	137.0	131.4
Mar.	609	570	150.6	138.8	137.9	135.1
April	611	582	168.3	134.3	153.3	134.1
May	615	563	175.8	121.4	155.6	135.8
June	623	578	167.6	125.6	154.7	134.4
July	623	585	163.2	138.0	153.9	135.1
Aug.	...	596	....	145.2	....	134.6
Sept.	...	596	....	139.6	....	136.2
Oct.	...	596	....	150.6	....	134.1
Nov.	...	600	....	143.4	....	136.7
Dec.	...	594	....	137.2	....	135.2

† Monthly average. * Figures for January and February, 1946, are merely averages derived from a report that combined those two strike-affected months.





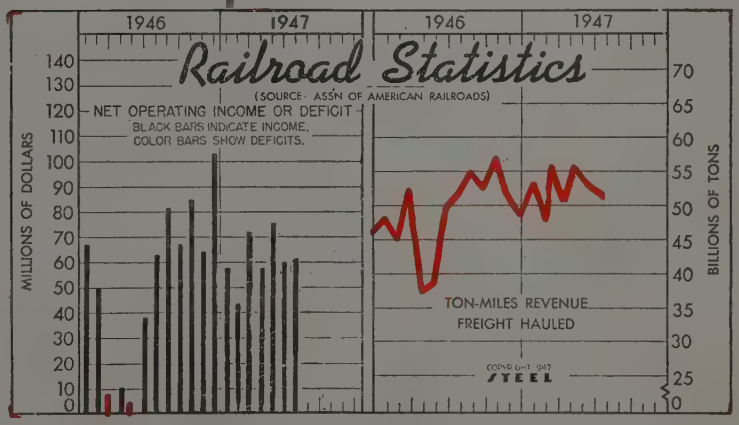
Malleable Iron Castings

	Shipments (000 omitted)		Unfilled orders for castings for sale (000 omitted)	
	1947	1946	1947	1946
Jan.	75.9	54.0	260	246
Feb.	74.7	40.2	274	249
Mar.	76.6	50.2	281	263
Apr.	81.9	65.0	275	268
May	75.5	62.6	262	272
June	78.5	61.6	249	276
July	64.2	64.4	235	272
Aug.	...	67.9	...	273
Sept.	...	69.5	...	277
Oct.	...	79.2	...	281
Nov.	...	69.0	...	278
Dec.	...	68.3	...	268

Statistics of Class I Railroads

	Net Operating Income (millions)			Ton-Miles Revenue Freight (billions)		
	1947	1946	1945	1947	1946	1945
Jan.	$57.7	$66.7	$76.0	53.3	48.2	56.8
Feb.	43.1	50.5	74.7	48.5	45.1	55.4
Mar.	72.8	*5.7	102.0	56.1	52.4	64.4
Apr.	58.4	10.7	95.1	50.7	37.4	61.4
May	75.7	*4.6	103.6	56.1	39.5	64.2
June	60.2	37.8	99.9	52.9	49.8	62.6
July	61.0	63.0	98.8	52.0	51.9	60.7
Aug.	...	81.7	87.5	...	55.0	56.8
Sept.	...	67.4	43.1	...	52.7	52.6
Oct.	...	85.1	52.4	...	57.0	49.8
Nov.	...	64.1	60.7	...	51.5	49.8
Dec.	...	103.0	42.0	...	49.6	46.3
Ave.	...	$51.6	$78.0	...	49.2	56.7

* Deficit.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,010	$10,125	$11,367	$11,409
Federal Gross Debt (billions)	$259.3	$260.0	$259.8	$265.7
Bond Volume, NYSE (millions)	$18.4	$13.3	$14.2	$41.8
Stocks Sales, NYSE (thousands)	3,718	2,892	3,662	12,724
Loans and Investments (billions)†	$63.8	$63.7	$63.6	$59.1
United States Gov't. Obligations Held (millions)†	$38,354	$38,395	$38,735	$40,492

† Member banks, Federal Reserve System.

PRICES

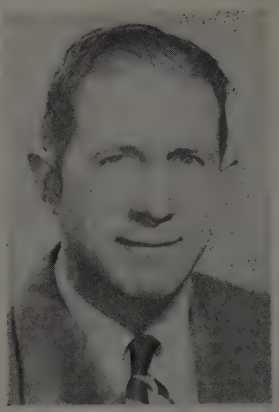
STEEL's composite finished steel price average	$75.41	$75.41	$75.41	$64.45
All Commodities†	154.9	154.0	152.2	122.0
Industrial Raw Materials†	168.5	167.9	166.4	137.5
Manufactured Products†	150.1	148.9	147.2	116.9

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

RALPH H. ISBRANDT

JOHN C. WIDMAN



STANLEY GLASER

Ralph H. Isbrandt has been named chief chassis engineer, and **John C. Widman,** chief body engineer of Kaiser-Frazer Corp., Willow Run, Mich. Mr. Isbrandt has been vice president and general manager of the Firestone Aircraft Co., Willow Grove, Pa., and in earlier years served variously with the A. O. Smith Corp., Milwaukee, Willys-Overland Motors Inc., Toledo, O., Buick, Nash, and the Firestone Tire & Rubber Co., Akron. Mr. Widman, in charge of the Ford Motor Co. body research department for the past two years, previously served for 15 years with the Murray Corp. of America, Detroit.

—o—

Vance R. Parker has been appointed sales engineer covering the Dayton, O., area for E. W. Bliss Co., Detroit. He has been associated with the company for the past 12 years, and was formerly sales engineer in the New York area. He recently returned from a special assignment tour of Latin America for the company.

—o—

A. Gordon Spencer has been appointed manager of the branch office recently opened by the George L. Nankervis Co., Detroit, which will service the Saginaw Valley district. Mr. Spencer formerly was chief metallurgist at the Chevrolet-Flint Division of General Motors Corp., Detroit.

—o—

Ernest A. Eynon, Portsmouth Steel Corp., Portsmouth, O., has been promoted from assistant general manager to general manager of the corporaton. He succeeds **L. D. Huestis,** who has retired as general manager but will remain as consultant on coal and coke.

—o—

H. Barnett has been appointed vice president and general manager of Welland Electric Steel Foundry Ltd., Welland, Ont., Canada. Before joining the company three years ago, Mr. Barnett had been director of research for the government-owned Electric Steels Ltd., Three Rivers, Que., and previous to that had been with the Shawinigan Chemicals Ltd., Shawinigan Falls, Que.

—o—

Paul Weathers has been appointed vice president and chief engineer of Airdesign Inc., transformer manufacturer, Upper Darby, Pa. He will have charge of all factory operations. For 16 years Mr. Weathers had been associated with RCA at Camden and Indianapolis, where he headed many engineering groups in the sound and electronic equipment field.

—o—

Baker Bros. Inc., Toledo, O., announces the following changes in its organization: **George E. Hallenbeck,** president, has been elected chairman of the board. He is succeeded as president by **A. L. Baker,** formerly vice president and general manager, who retains the latter position. **Herbert L. Tigges,** vice president in charge of sales, has been elected executive vice president; **R. K. Chapman,** secretary and treasurer, re-elected to the same position; **M. E. Fischer,** superintendent, elected vice president in charge of manufacturing; **Thomas L. Hallenbeck,** research engineer, elected vice president and director of engineering; **Glo Temple** continues in the position of chief engineer.

—o—

John W. Lohnes, district sales manager of the Vanadium Corp. of America, New York, has been appointed general sales manager of the International Graphite & Electrode Corp., St. Marys, Pa. He served with Vanadium for 11 years, and prior to that, had been with the Carnegie-Illinois Steel Corp.

—o—

A. Douglas Proctor, associated for the past nine years with Heald Machine Co., Worcester, Mass., as sales and service engineer working with dealers all over the country and British Columbia, has become associated with Harrington-Wilson-Brown Co., New York, as branch manager at Hartford, Conn.

—o—

Stanley Glaser has been appointed to the post of manager, radio section of the Crosley Division, Avco Mfg. Corp., Cincinnati. Prior to joining Crosley Division, Mr. Glaser has been associated with Goldblatt Bros., Chicago, and previous to service during the war with the U. S. Army Air Corps., he had been general manager of the Star Radio Co., Washington.

—o—

Charles R. Moffatt, director of advertising of the U. S. Steel Corp., New York, will retire Sept. 30 after 40 years' continuous service with the corporation. Mr. Moffatt was named advertising manager of the Illinois Steel Co., in 1919. When that company was consolidated with Carnegie Steel in 1935, he became advertising manager of the new Carnegie-Illinois Steel Corp. Three years later, he was appointed the first director of advertising of the United States Steel Corp., continuing in that capacity until the present time.

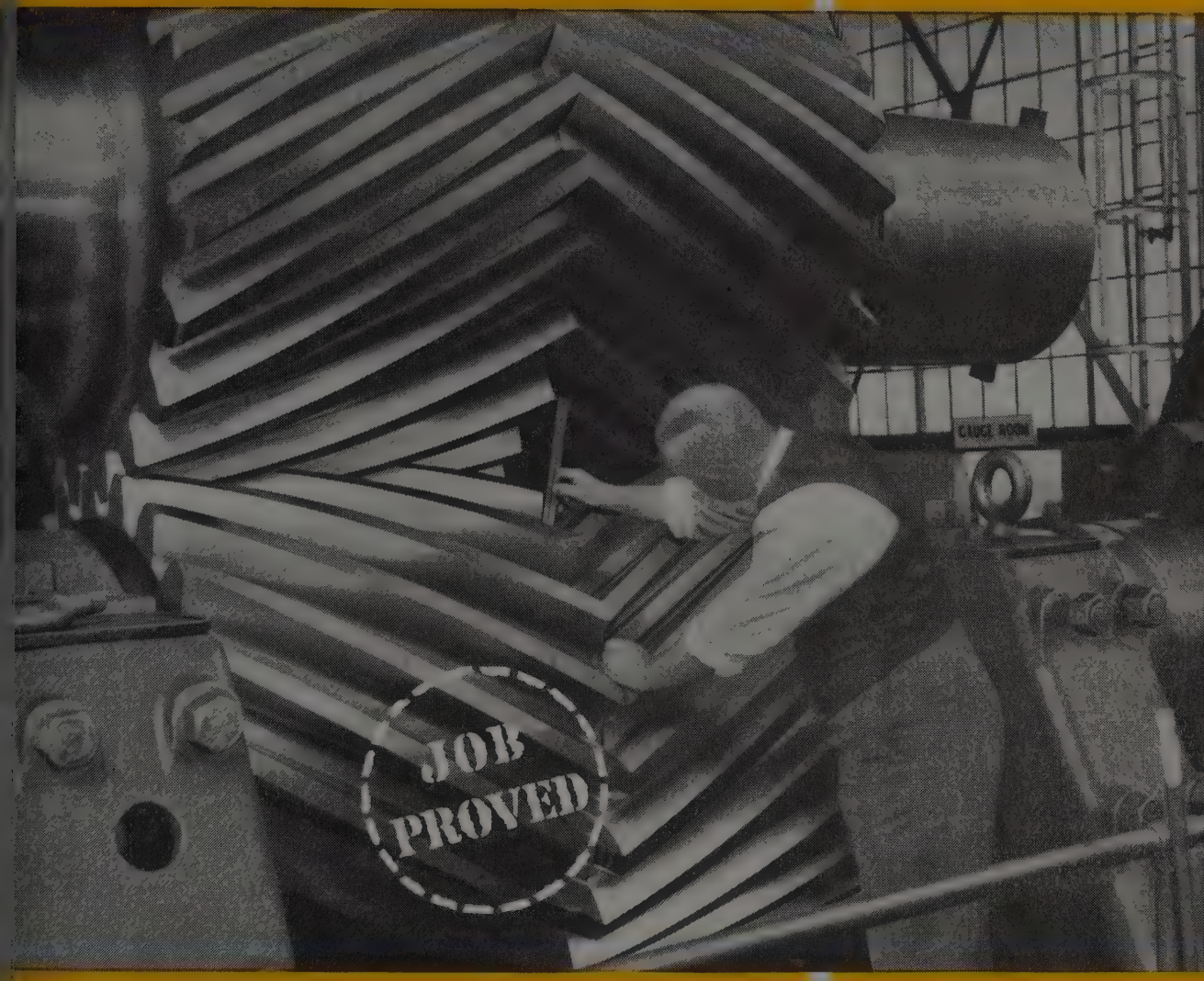
—o—

Harry Y. McCool Sr., superintendent of maintenance, Timken Roller Bearing Co., Canton, O., in the Steel & Tube Division, has retired. He is succeeded by **Leland S. Steiner,** assistant superintendent of maintenance for the last two years.

—o—

William B. Frey has been appointed manager of the Chicago branch, Montgomery Elevator Co., Moline, Ill. He will supervise company sales operations in northern Illinois, Wisconsin, part of

Production Up 22% on 44-Inch Pinion Gears



SUNICUT . . .

Enables Gear Manufacturer to Increase Feed, Speed, and Tool Life; and to Improve Finish

Since changing to Sunicut, a manufacturer of steel-mill gears has increased production by 22%, improved finish, and added greatly to the life of his gear cutters.

Operation: Cutting 44" herringbone gears.
Machine: Dominion herringbone gear generator.
Materials: Stainless steel, high carbon steel, bronze, other alloys.
Cutting Oil: Sunicut.

This case is just one of thousands in which experienced production men have found that Sun "Job Proved" cutting oils help to increase production and to improve quality as well.

Sunicut is a clear, free-flowing cutting oil, produced by an exclusive Sun process. It has high lubricating value and has excellent heat-dissipating and anti-weld properties. It makes possible heavy cuts at high speed while accuracy and satin-smooth finish are maintained. For full information call your Sun Cutting Oil Engineer or write Department S-8.

SUN OIL COMPANY • ***Philadelphia 3, Pa.***
In Canada: Sun Oil Company, Ltd.—Toronto and Montreal

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INDUSTRIAL PRODUCTS

Minnesota and Indiana, Michigan and Ohio. He formerly had been connected with the Los Angeles office of the Pacific Coast Elevator Co.

—o—

Dr. Gurdon M. Butler Jr. has been appointed a senior engineer of the Research Division, Carborundum Co., Niagara Falls, N. Y. He formerly had been associate director of research of the Tool & Die Steel Division, and later was chief metallurgist at the Dunkirk, N. Y., plant of Allegheny Ludlum Steel Corp.

—o—

American Foundrymen's Association announces the chairman of its nine-man 1948 nominating committee is **Sheldon V. Wood**, president and general manager of Minneapolis Electric Steel Castings Co., and immediate past president of the association.

Other committee members are **Fred J. Walls**, Detroit, office manager in that city for International Nickel Co., and president of AFA for 1945-46; **William M. Ball Jr.**, Cincinnati, foundry superintendent of Magnus Brass Division of National Lead Co.; **Robert E. Haley**, Los Angeles, owner of Advance Aluminum & Bronze Co.; **Russell F. Lincoln**, Cleveland, president of Russell F. Lincoln & Co.; **Henry B. Hanley**, Rochester, N. Y., foundry manager of American Laundry Machinery Co.; **Lloyd D. Wright**, Geneva, N. Y., superintendent of U. S. Radiator Corp.; **L. Edward Roby**, Peoria, Ill., superintendent of Peoria Malleable Castings Co.; and **Earl M. Strick**, Erie, Pa., finishing superintendent of Erie Malleable Iron Co.

—o—

Poole Foundry & Machine Co., Baltimore, Md., announces appointment of C. M. Murray, Toronto, Ont., as exclusive Canadian representative in the provinces of Ontario and Quebec for the sale of Poole flexible shaft couplings.

—o—

S. J. Ryan has been appointed assistant manager of the Tin Plate Sales Division, Wheeling Steel Corp., Wheeling, W. Va. He joined the corporation in 1924, and has been a salesman, traveling out of the Chicago district office.

—o—

The Brown Instrument Division of Minneapolis-Honeywell Regulator Co., Minneapolis, announces the following additions and promotions in the sales and service engineering staff: **Edward B. Kohl** has been transferred to Corpus Christi. He previously had been with the Houston, Tex., branch office of the company. **I. K. Farley** has been transferred from the Philadelphia branch office to Houston. **John D. Root**, formerly instructor at the Brown School of Instrumentation, has been named sales engineer at Philadelphia. **E. Curt Richards** has been transferred from the general sales department to the New York sales engineering staff. **Thomas Pitts** has been appointed industrial sales engineer at the Charlotte branch office. The following have been added to the company's branch office field service engineering staffs: **William E. Brittain, Edward J. Chance, Ethron B. Deebel, Gerald R. Dryden, John W. Forbes, Carl R. Haug, Willard A. Holm, Roger F. Lederer, Albert J. Leonaitis, Elgin H. Lochte, John E. Luttrell, Kenneth Shapleigh, Clayton K. Taylor, Robert H. Walker,** and **Frank M. West.**

—o—

Thomas A. Claiborne has joined the Vanadium Corp. of America, New York, in the engineering sales department. He will cover the petroleum production and refining fields from his headquarters in Houston, Tex.

—o—

Walter Pons of the engineering department of Copperweld Steel Co., Glassport, Pa., has been promoted to sales engineer, and will cover Indiana and the southern peninsula of Michigan. He will make his headquarters at Chicago.

—o—

William L. DuPree has resigned as factory manager for the Lennox Furnace Co., Syracuse, N. Y., and has taken an option from the company to purchase one of its foundries.

—o—

Edwin R. Jung has been appointed manager of industrial sales for Clark Controller Co., Cleveland. His new duties will embrace application of Clark apparatus to steel and other heavy industries. He has been Atlantic Coast regional manager for most of the 17 years he has been associated with the company.

—o—

Rear Adm. William Granat, U. S. Navy (retired), has joined the firm of Lester B. Knight & Associates Inc., Chicago. During his career in the Navy, he had been head of the metallurgical, metallographic, physical, and chemical laboratories, U. S. Naval Gun Factory, Washington, engaged in the research and development of ferrous and nonferrous metals and various materials for ordnance use, and later spent many years in the Navy Department with the Bureau of Ordnance.

EDWIN R. JUNG

—o—

Selma M. Andrews has been named director of Hotpoint Institute, appliance research and test center and use-value training headquarters for Hotpoint Inc., Chicago, subsidiary of General Electric Co.

—o—

Fred C. Schulz has been named operating manager, Associated Lines Sales Division, B. F. Goodrich Co., Akron. He has been a district credit manager for the Tire Division. **Herman C. Wey** has been appointed assistant to the manager of passenger car tire sales, Replacement Tire Sales Division. He succeeds **Edwin J. Lewis**, who has been named manager of petroleum company sales. **L. R. Keltner**, superintendent, Akron Tire Division, has been named manager of the Los Angeles plant to succeed **P. W. Perdriau**, who assumes Mr. Keltner's former post in Akron.

—o—

The American Welding Society has elected **Joseph G. Magrath** as executive secretary of the society. He had been sales manager of the McAleer Mfg. Division of Climax Industries Inc., and had previously been associated with Air Reduction Sales Co., New York, where during the war he was active in the exploration of welding, cutting and brazing, and other flame-treatment processing of welded fabrication. He had been active in the work of the New York section of the American Welding Society, and served for several years as chairman of publicity and programs.

—o—

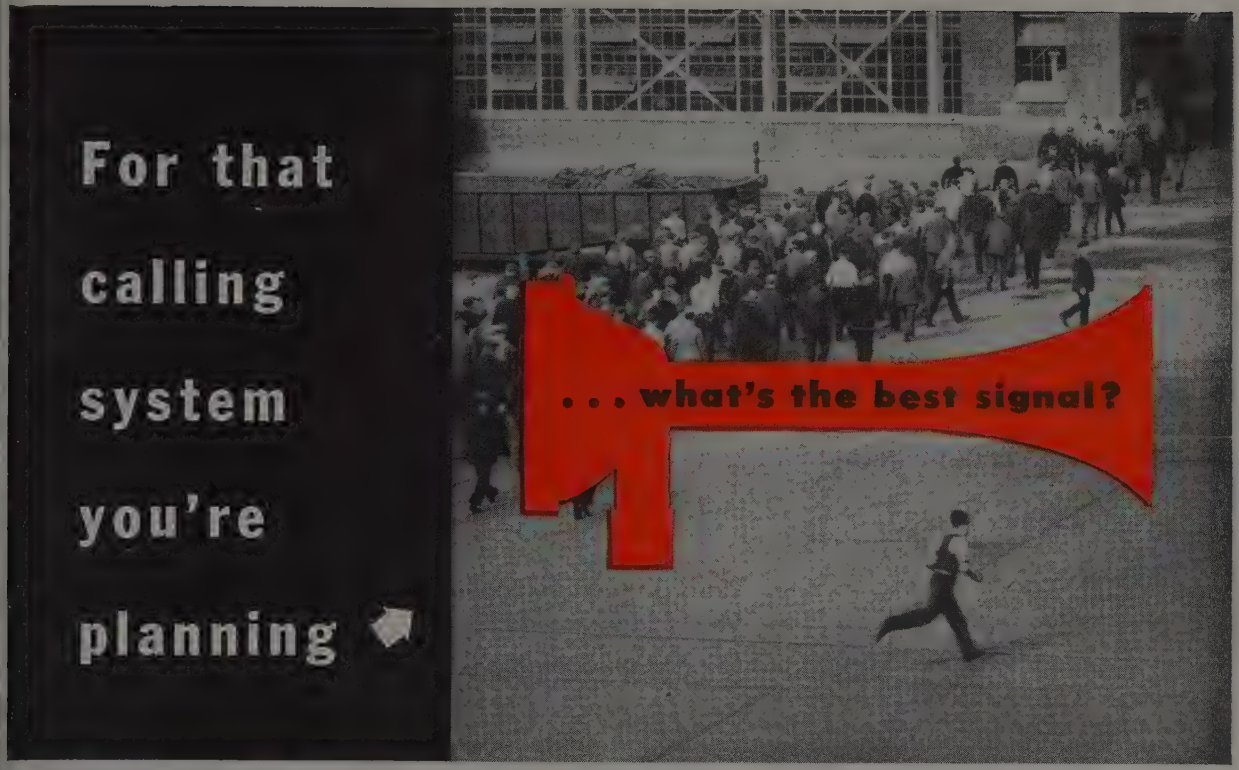
John J. Tapper, works manager at Illinois Tool Works, Chicago, manufacturer of metal cutting tools, has been selected to attend the 12th session of the Advanced Management Program to be held at Harvard University from Sept. 17 to Dec. 13, a group representing all phases of industry and business.

—o—

Dr. Clarence K. Morehouse, dry cell battery specialist, formerly with the National Bureau of Standards, has been engaged to do research work on battery problems for the Winchester Repeating Arms Co. and Bond Electric Corp., divisions of Olin Industries Inc., East Alton, Ill.

—o—

William M. Dougherty has been appointed assistant to the president, United States Rubber Co., New York. He joined



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the company's commercial research department 25 years ago, and, after serving in various positions, was elected an assistant secretary in 1941, which position he will retain.

—o—

Col. Luke Harris has been elected a director and vice president in charge of sales, Lockheed Aircraft Service Inc., subsidiary of Lockheed Aircraft Corp., Burbank, Calif.

—o—

David Y. Robinson has been named sales manager of electric heating units, a new line for Yale & Towne Mfg. Co., New York.

—o—

Changes in the Stamford, Conn., Division of Yale & Towne Mfg. Co., New York, are as follows: **William R. Hoyt,** general manager, has been appointed assistant to the vice president in charge of production, and will have headquarters at the company's executive offices in New York. **Mark A. Miller,** assistant general manager, has been named general manager of a new plant to be established near Roanoke, Va., which will manufacture automotive and other specialty locks, the manufacture and sale of which will be transferred to the new plant from the Stamford Division. **J. Bryan Williams Jr.,** special assistant to the general manager, will succeed Mr. Hoyt as general manager of the Stamford Division. **Hugh J. Mathews,** assistant secretary of the company, will be transferred from the New York offices to the Stamford Division, and will supervise all accounting and office procedure, as well as continue his duties as an officer of the company.

—o—

R. C. Hoff has been appointed factory manager in charge of engineering and production at the Eriez Mfg. Co., Erie, Pa.

—o—

J. Gerald O'Malley has been named superintendent of the new cold drawn bar mill now nearing completion at the Brier Hill works, Youngstown Sheet & Tube Co., Youngstown. He has been connected with American Steel & Wire Co. at Worcester, Mass.

—o—

William W. Bane has been named assistant traffic manager of the American Welding & Mfg. Co., Warren, O. He joined the company in January as assistant to the traffic manager. Previously he had been connected with Empire Steel Corp., Mansfield, O., Rappold Co. in Warren, O., and the Copperweld Steel Co., Glassport, Pa.

—o—

Frank A. Burns has been appointed public relations representative of Columbia Steel Co., Pacific Coast subsidiary of U. S. Steel Corp. He will cover southern California, Arizona and southern Nevada area. For the past five years Mr. Burns has been assistant director of public relations in Columbia's San Francisco general office.

—o—

A. F. Fisher has been appointed executive vice president of Telechron Inc., subsidiary of General Electric Co., Schenectady, N. Y. He had been vice president in charge of manufacturing and engineering since 1945. **Harold E. Blackburn** has been named field sales manager for the company.

—o—

K. Blair Benson, formerly of General Electric Co., Schenectady, N. Y., has been appointed senior engineer of United States Television Mfg. Corp., New York.

—o—

A. R. Welton, who joined Sperry Corp., New York, two years ago, has been elected vice president of the corporation.

—o—

Franklin J. Zielsdorf, chief industrial engineer of Oliver Corp., Chicago, has been appointed manager of the corporation's Springfield, O., farm implement plant.

—o—

Thomas Steel Co., Warren, O., announces promotion of **H. L. Mills,** industrial engineer, to superintendent of industrial relations. **G. T. Marshall,** director of personnel, has been named superintendent of the maintenance department.

—o—

Heppenstall Co., Pittsburgh, has announced the addition of four new members to its sales personnel: **David P. Williams,** formerly vice president, Vulcan Mold & Iron Co., Latrobe, Pa., is now representing the company in the Pittsburgh sales district. **Lawrence R. Malm,** formerly at the Irvin Works, Carnegie-Illinois Steel Corp., also has been assigned a sales territory in the Pittsburgh district. **W. H. Ritenbaugh,** transferred from the company's knife department at the Pittsburgh plant, is now a sales engineer, selling Heppenstall chipper knives to the paper and pulp industry. **E. V. Alderson,** chief accountant of the company, has been appointed statistician for the Pittsburgh sales department.

—o—

Hubert E. Snyder has been appointed managing director of the Toncan Culvert Manufacturers Association. He has been associated with the Penn Metal Corp., Philadelphia, since he retired from the Army two years ago. Prior to the war he was engaged in culvert manufacturing at Elmira, N. Y. The association recently moved its offices to Room 909 Midland Bldg., Cleveland. Mr. Snyder succeeds **P. H. Pickering,** resigned.

—o—

Tom Mason has been appointed regional manager in the central district of Crosley Division, Avco Mfg. Corp., Cincinnati. He previously had been manager of the Cincinnati branch of Ohio Appliances Inc.

—o—

John S. Lennox has retired from the General Electric Co., Schenectady, N. Y., after 41 years' service. After working in the testing department and transformer engineering department of the company, he was transferred to the power transformer commercial section in 1923, and was later appointed traveling power transformer specialist. From 1941 until his retirement he also served as general assistant to the sales manager.

—o—

Arthur C. Pearson, Hanson-Van Winkle-Munning Co., Matawan, N. J., will be transferred, Oct. 1, from the Philadelphia office to New England, where he will be associated with **Frank**

TROY T. ALVERSON

Appointed assistant manager, Dust & Fume Control Division, American Wheelabrator & Equipment Corp., Mishawaka, Ind. Noted in STEEL, Sept. 15 issue, p. 82

CARL STUGARD

Who has been appointed manager of the Pittsburgh office of Cincinnati Milling & Grinding Machines Inc., Cincinnati. Noted in STEEL, Sept. 15 issue, p. 87

LOREN E. BOYSEL
Appointed body engineer at Willys-Overland Motors Inc., Toledo, O. Noted in STEEL, Sept. 15 issue, p. 86

LAWRENCE C. FLICKINGER
Appointed chief chemist for the Youngstown district, Youngstown Sheet & Tube Co. Noted in STEEL, Sept. 15 issue, p. 87

DR. MAXWELL GENSAMER
Appointed assistant to director of research, Carnegie-Illinois Steel Corp. Noted in STEEL, Sept. 15 issue, p. 86

J. Clark in covering Massachusetts and nearby territory. **Howard L. Wright** also will be transferred at that time from the New York state territory to Philadelphia.

—o—

Benjamin E. Sivyer, formerly divisional sales manager in Milwaukee for Chain Belt Co., Milwaukee, has been appointed Wisconsin district sales manager for the company.

—o—

Eugene Barry has been elected to the board of directors of McQuay-Norris Mfg. Co., St. Louis, producer of piston rings and other automotive parts. Mr. Barry is a partner of Shields & Co., New York.

—o—

Z. G. Taylor has been appointed assistant manager, Manufacturing Division, in the lamp department of General Electric Co., at Nela Park, Cleveland, and **H. F. De Long** has been named to succeed Mr. Taylor as manager of the department's lamp works. Mr. Taylor succeeds **G. E. Burens,** who recently joined Telechron Inc., as vice president in charge of manufacturing.

—o—

Thomas A. McHugh has been appointed New York representative of Stacey Mfg. Co., Cincinnati.

—o—

Clarence M. Taylor has resigned as executive vice president of the Lincoln Electric Co., Cleveland, to establish his own business, which will be announced later.

—o—

Fred A. Glenn, superintendent of the finishing department, National Radiator Co., New Castle, Pa., has been appointed superintendent of the company's New Castle plant, succeeding Edward L. Brundage, who has resigned.

—o—

The Reading Tube Corp., New York, announces election of **Sam Sterling** as vice president in charge of sales. Prior to his election as vice president, Mr. Sterling was general sales manager in charge of national sales.

—o—

W. S. O'Connor has been appointed sales manager, Standard Tool Co., Cleveland. He had been general sales manager, U. S. Gauge Division of American Machine & Metals Inc., New York.

—o—

O. Fred Yando has been appointed manager of the Indianapolis sales district of Ford Motor Co., Dearborn, Mich.

OBITUARIES

Frank H. Fairbanks, 56, president, Horix Mfg. Co., Pittsburgh, died at his home in that city Sept. 13. He had served as president of the National Packaging Machinery Manufacturers Institute, and had been president of the Canners Machinery Manufacturers Association.

—o—

Howard E. Davis, 58, manager of sales of heavy chemicals in the Grasselli department of E. I. du Pont de Nemours & Co., Wilmington, Del., died Sept. 13. He joined the organization in 1928 when the Du Pont company purchased the Grasselli Chemical Co., Cleveland.

—o—

Carl A. Hanson, 36, sales manager of the Ellison Bronze Co., Falconer, N. Y., died Sept. 8 after a brief illness.

—o—

W. A. Ruhl, 48, works manager, Universal Winding Co., Providence, R. I., died recently after an illness of several weeks. He joined the company in 1933, and previously had been connected with Chain Belt Co., Milwaukee.

—o—

Frank Armstrong, 72, until his retirement in 1943 a partner in the firm of Pickands, Mather & Co., Cleveland, died Sept. 13 at his summer home at Novelty, O. For a number of years he had been a director of the Interlake Steamship Co., and in 1940 and 1941 a president of the Interlake Iron Corp., Chicago.

—o—

Frederick H. Bultman, president, F. H. Bultman Co., Cleveland, manufacturer of gears and special machinery, died Sept. 5.

—o—

E. B. Mentel, 58, sales executive in the Seattle office of Bethlehem Pacific Coast Steel Corp., died Sept. 7 of a heart attack. He started to work for the company in 1918, when it was known as the Pacific Coast Steel Co.

—o—

Royal F. Strickland, 64, for 32 years a member of the engineering staff at Nela Park, Cleveland, General Electric Co., died Sept. 13 in Jacksonville, Fla. For many years he was engaged in experimental work in lamp development. He retired a year ago.

—o—

Bernard J. McKenna, 48, superintendent of the House Heating Division, National Advisory Committee for Aeronautics died Sept. 14 in Cleveland.

—o—

Edward F. Wagner, 67, secretary and purchasing agent, Kewanee Boiler Corp., Kewanee, Ill., died Sept. 13 after a year's illness. He had been associated with the company 47 years.

—o—

Emil E. Hollander, 66, founder and retired president, Star Electric Motor Co., Bloomfield, N. J., died Sept. 11.

—o—

Ferdinand Andrews, 80, former superintendent, furnace department, Raritan Copper Works, Perth Amboy, N. J., died Sept. 11.

Welding Hardenable

It is possible to forecast heat response of many steels by taking advantage of metallurgical information made available in the last 10 to 15 years. In the first of a two-part article the author discusses the Lehigh system of analyzing weldability of hardenable steels

WELDING of hardenable steels is frequently considered to be a problem in heat treating. Keeping this viewpoint in mind, the higher carbon and low alloy steels that become hard enough to crack upon heat treatment are included in this hardenable steel grouping. Since the welding engineer concentrates on avoiding excessive hardness, he uses the latest metallurgical tools and information to avoid structures frequently sought in heat treatments.

Today it is possible to forecast the heat response of many steels by taking advantage of metallurgical information made available in the last 10 to 15 years. Welding the hardenable steels logically falls into four distinct phases:

I. An analysis of weldability based on the Lehigh system.

II. The use of S curves in studying weldability.

III. Preheating and postheating to avoid martensite formations.

IV. Selection of low hydrogen lime-ferritic electrodes for welding hardenable steels.

Lehigh System: A very simple and highly practical approach to alloy steel welding by the metallic arc process is found in the so-called Lehigh system worked out at Lehigh University.[1] For detailed study, data are available in a *Guide to Weldability of Steels* prepared by the American Welding Society. Since this publication offers a ready means to understanding some of the problems of hardenable steel fabrication, it will be used extensively to work out some examples. In order to further simplify matters, only the highlights will be considered, leaving the finer shading to be studied individually by those who wish a more detailed picture.

Metallic arc welding involves high temperatures, sudden release of large quantities of heat in a small area and rapid cooling. Mild steel runs the gamut of these severe conditions without cracking. Alloy and higher carbon steels frequently crack up. Therefore, the welding engineer must establish conditions that will permit the alloy and higher carbon steel to combat violent welding conditions on more equal terms in order to come out of the welding operation with full ductility and undamaged by cracks.

To understand properly the Lehigh system, a very low alloy steel with enough carbon and manganese to present a typical hardenable steel welding problem will be selected. The steel to be explored is A-4037 with the analysis given in Table I.

In this plan for evaluating the weldability of hardenable materials, a slow bend ductility of 20 degrees has been selected as the lowest safe value for average structures that are not to be stress relieved after welding. Or, if stress relieving is practical, a slow bend ductility of 10 degrees is permissible. These minimum requirements will be accepted.

First step in the procedure is to heat treat a number of pieces of the alloy to be welded, bend these pieces and determine the angle of radial bend and the hardness. When this is done, a graph such as Fig. 1 may be pre-

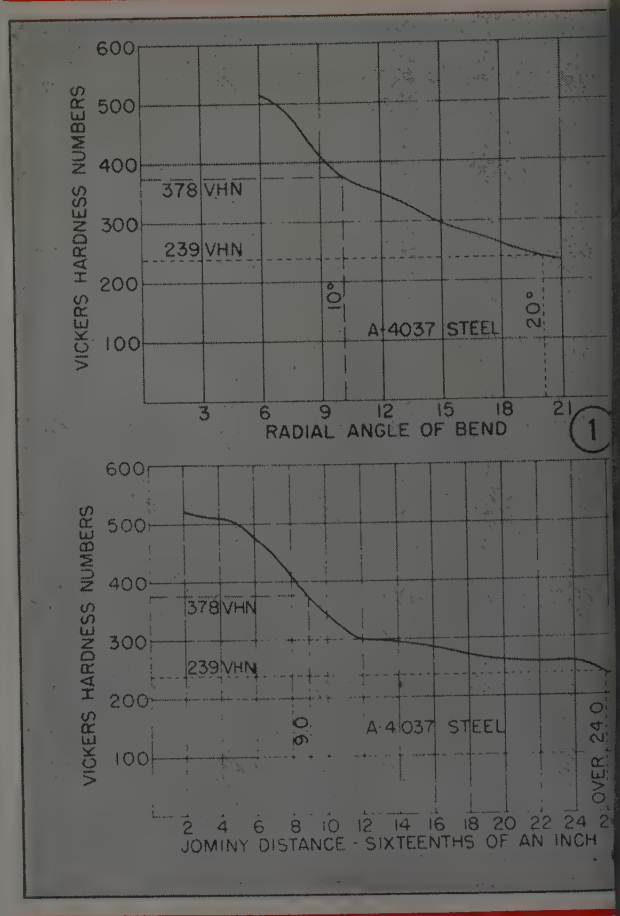


Fig. 1—Angle of bend related to hardness
Fig. 2—Jominy distance related to hardness
Fig. 3—Factors influencing cooling rate
Fig. 4—Effect of electrode diameter on heat affected zone hardness
Fig. 5—Increasing travel speed spells increasing hardness
Fig. 6—Joint design affects heat extraction

By ORVILLE T. BARNETT
Division Engineer, Electrode Division
Metal & Thermit Corp.
New York

Steels

pared. From this graph it is apparent that a ductility of 20 degrees is equal to a VHN (Vickers hardness number) of 239, while a ductility of 10 degrees allows a VHN as great as 378.

It is necessary to establish the hardness values that correspond to the ductility values that are being used. Hardness, as will be seen later when the Jominy test is integrated into the program, cannot be used by itself. That is, hardness limits cannot be used alone in order to eliminate the outlined ductility tests. The explanation lies in the fact that for different steels, hardness and ductility relationships vary. Table II proves this point by taking hardness levels of 200 and 350 VHN and comparing the ductilities of several steels at these hardnesses.

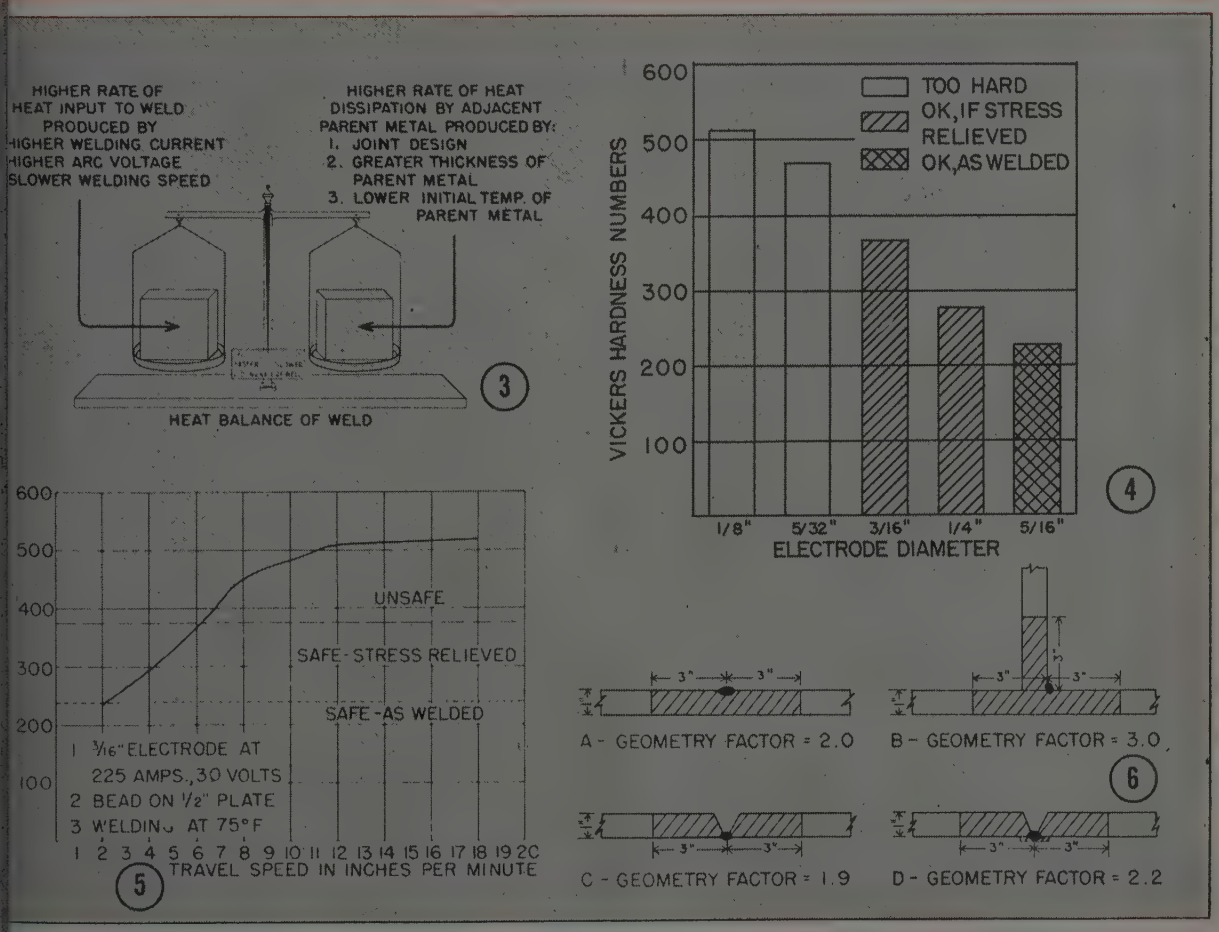
Because many welding engineers more commonly deal in brinell rather than Vickers hardness numbers, the relationship between these two hardness values is given in Table III for a few of the more common points to be encountered in this particular treatment.

Particular attention must be given to hardness of heat affected zone just outside the fusion zone. In order to relate cooling rates to hardness levels, it is necessary to make a simple Jominy hardness test. When this test is completed, the distances along the Jominy bar away from the quenched end are examined for hardness.

This second test provides the welding engineer with a definite knowledge of the response of A-4037 steel to different rates of cooling. Thus, as Fig. 2 discloses, a 10 degree bend angle in this steel corresponds not only to a Jominy distance of 9.0 (these distances refer to 1/16-inch increments from the water quenched end of the bar) but also to a 10 degree bend angle.

Similarly, a much softer A-4037 steel with a slow cooling rate represented by a Jominy distance of over 24.0 gives us a 20 degree bend angle. Now simple bend tests and equally easy to make Jominy test bar have established basic requirements to which the tables given in the *Guide to Weldability* can be applied in order to demonstrate other significant welding conditions.

An attractive feature of this scheme is the fact that all work can be done with inexpensive test pieces and without making a single weld. Quite obviously, as the balance in Fig. 3 adopted from a presentation by Dr. Robert H. Aborn[2] shows, cooling rate of heat-affected zone of a



hardenable steel is dependent upon heat input and heat extraction.

Consider heat input for a moment. If a piece of hardenable alloy steel is heated with a paper match, nothing much happens. But if the same piece of alloy is heated with an oxyacetylene torch for a long enough time, the steel gets visibly hot and the metallurgical structure changes a great deal. So heat input must be important.

Now look at heat extraction. Suppose the alloy steel piece is heated with the torch until it is at a temperature of about 1800° F. If the piece is buried in powdered lime, it will cool very slowly and end up quite soft. But if, instead of being cooled slowly in powdered lime, it is plunged into water, the piece is hard, and if of a very hardenable composition, quite brittle. So heat extraction must be important too.

This is, however, primarily a welding problem where heat input is governed by the size of electrode which in turn fixes other conditions such as welding current, arc voltage and speed of travel. Similarly, heat extraction is governed by the welding joint, by thickness of the steel and by the temperature of the steel. All factors of heat input may be placed in one balance pan; factors of heat extraction may be placed in the other balance pan. As with any change in weights in balance pans, cooling rates are affected by changes in any of the individual influencing factors.

Some welding conditions are fixed by the welded structure itself while others can be manipulated by the welding engineer. In order to understand the question of heat input, three fixed conditions will be chosen:

1. A single bead on 1/2-inch plate.
2. The plate at room temperature of 75° F., and
3. A welding speed of 6 inches per minute will be assumed. Selecting E6020 electrodes from 1/8 to 5/16-inch in diameter with logical values for current and arc voltage produces the data outlined in Table IV.

Here the welding engineer comes to grips with his problem and settles the question of a suitable electrode diameter and type, which are only important at this point because of their contributions to the kilowatts of heat input. Later on, the electrode type will be discussed in its relationship to an overall joint of good quality. Although the data of Table IV ought to be reported in Fig. 4 in terms of Jominy distance, hardness values have been selected as the index for illustration. Of course, by means of Figs. 1 and 2, hardness, Jominy distance and ductility may all be related for this case history. Therefore, hardness, only because most everyone is more accustomed to dealing with hardness figures, has been chosen for the medium of outlining the role of electrode size in the story of heat affected zone hardnesses of hardenable steels.

Fig. 4 shows quite conclusively that with a fixed rate of heat extraction, increasing current and voltage reduces heat affected zone hardness. A most effective way of keeping values within safe bounds, remembering that hardness is only an index to ductility which is the important consideration, is afforded the welding engineer through the selection of larger diameter electrodes.

Having considered what happens when current and arc voltage increases because of larger electrode sizes, there remains the question of speed of travel. The answer is quite apparent. Faster speeds put less effective heat into the molten pool, that is, less extra heat for slowing down the cooling rate of the steel being welded, and the heat affected zone becomes harder as speed is increased.

Still investigating A-4037 steel, it is quite easy to illustrate this factor. Assuming a 3/16-inch electrode to be used at 225 amperes and 30 volts which give a Kw of 6.8, a single bead on a 1/2-inch plate and welding at room temperature, the influence of welding speed can be evaluated.

Fig. 5 graphically portrays the increasing hardness brought about as the speed of welding becomes faster and faster. Summing up this study of heat input, it has been shown that amperes, volts and travel speed combine to govern this side of the heat balance.

Within limits, the welding engineer can control these factors of heat input. He can choose as large a diameter of electrode as his work will permit. He can operate the electrode at the highest practical amperage. He can, in general, do little about arc voltage as this value is preset by coating type and optimum welding technique with little opportunity for change. If a bead is being deposited on a steel plate, there is wide (*Please turn to Page* 110)

TABLE I
CHEMICAL ANALYSIS OF A-4037 STEEL

Steel	C	Mn	P	S	Si	Mo
A-4037	0.35	0.85	0.015	0.017	0.29	0.25

TABLE II
DUCTILITIES OF SEVERAL CARBON AND LOW ALLOY STEELS AT DEFINITE HARDNESS LEVELS

VHN	Steel	Angle of Radial Bend in Degrees
200	SAE 1020	26
	SAE 1035	24
	NAX	30
	YOLOY	29
	MAYARI	30
350	SAE 1035	9.5
	SAE 2330	10.5
	A-4037	12.0
	SAE 3135	9.5
	SAE 6145	7.0
	NE 8620	14.5

TABLE III
RELATIONSHIP OF BRINELL AND VICKERS HARDNESS NUMBERS

Brinell	VHN
200	200
250	250
300	301
350	360
400	419

TABLE IV
INFLUENCE OF ELECTRODE SIZE ON HEAT INPUT IN THE WELDING OF LOW ALLOY STEELS

Diameter	Amperes	Volts	Kw
1/8	120	24	2.9
5/32	175	27	4.7
3/16	225	30	6.8
1/4	350	33	11.6
5/16	475	36	17.1

TABLE V
HARDNESS VARIATIONS IN THE HEAT AFFECTED ZONE OF A4037 STEEL AS AFFECTED BY JOINT DESIGN

Remarks	Joint	Hardness
Safe-Stress Relieved	Bead on plate or last pass butt ...	346
Unsafe	Tee fillet weld	438
Safe-Stress Relieved	First pass butt	334
Safe-Stress Relieved	First pass butt with back-up bar ..	369

TABLE VI
HARDNESS CHANGES IN THE HEAT AFFECTED ZONE OF A4037 STEEL AS A FUNCTION OF PLATE THICKNESS

Remarks	Plate Thickness, Inches	Hardness, VHN
Safe-As Welded	1/2	233
Safe-Stress Relieved	5/8	260
Safe-Stress Relieved	3/4	281
Safe-Stress Relieved	1	302
Unsafe	1 1/4	392
Unsafe	1 1/2	398
Unsafe	2	458

TABLE VII
HEAT AFFECTED ZONE HARDNESS CHANGES WITH PLATE TEMPERATURE

Remarks	Plate Temperature, °F.	Hardness, VHN
Unsafe	32	410
Safe-Stress Relieved	75	369
Safe-Stress Relieved	200	346
Safe-Stress Relieved	300	321
Safe-Stress Relieved	400	308

Design Considerations for Carbide

SHEET METAL DIES

Prime construction features of various blanking and progressive dies and of blanking punches are outlined here

By EARLE GLEN
Carbide Die Engineer
Carboloy Co. Inc.
Detroit

IN GENERAL there are few important differences between dimensional designs of carbide and steel dies. In cases where the job is entirely new and a large die investment is involved, however, a try-out die of steel and then a duplication of this in carbide are recommended. This permits modifying the original design before the carbide die is produced.

Tables of dimensional limits on Carboloy die and punch nibs, for the general use of die manufacturers in ordering carbides are now available. These indicate the amount of stock to be allowed on dies for finishing, both outside and inside diameters for various sizes of dies and punches. The amount of excess stock generally recommended ranges from 0.008-inch up, depending on size.

A few of the typical dies, particularly the more recent developments in blanking dies and progressive dies employing cemented carbide, are reproduced here. Fig. 2 shows a typical carbide lamination die for electric motors. Up to 2 million circular laminations have been produced per grind with these dies. Stock is 0.025 silicon steel.

Another motor lamination die, Fig. 3, is one of five-stage progressive rather than indexing type, for motor rotors and stators. Combination die on which 8 million stainless steel, 30 per cent chromium radio tube parts were punched, drawn and trimmed without reworking dies once during the entire run, is illustrated in Fig. 1.

Fig. 4 shows nine-station die block using carbide nibs and sections in the fifth and tenth station, first forming and cut-out dies. Part is tie-rod bearing. In service one year during which carbide stations produced 5 million draws without maintenance and cut-out die 2 million operations for each resharpening.

Draw Die Design: Usual practice is to take just a light finishing grind on outside diameter of carbide nib and then grind steel case to fit nib. Dies must be so designed that inside diameter can be finished by grinding and/or lapping since carbides cannot be machined. This means

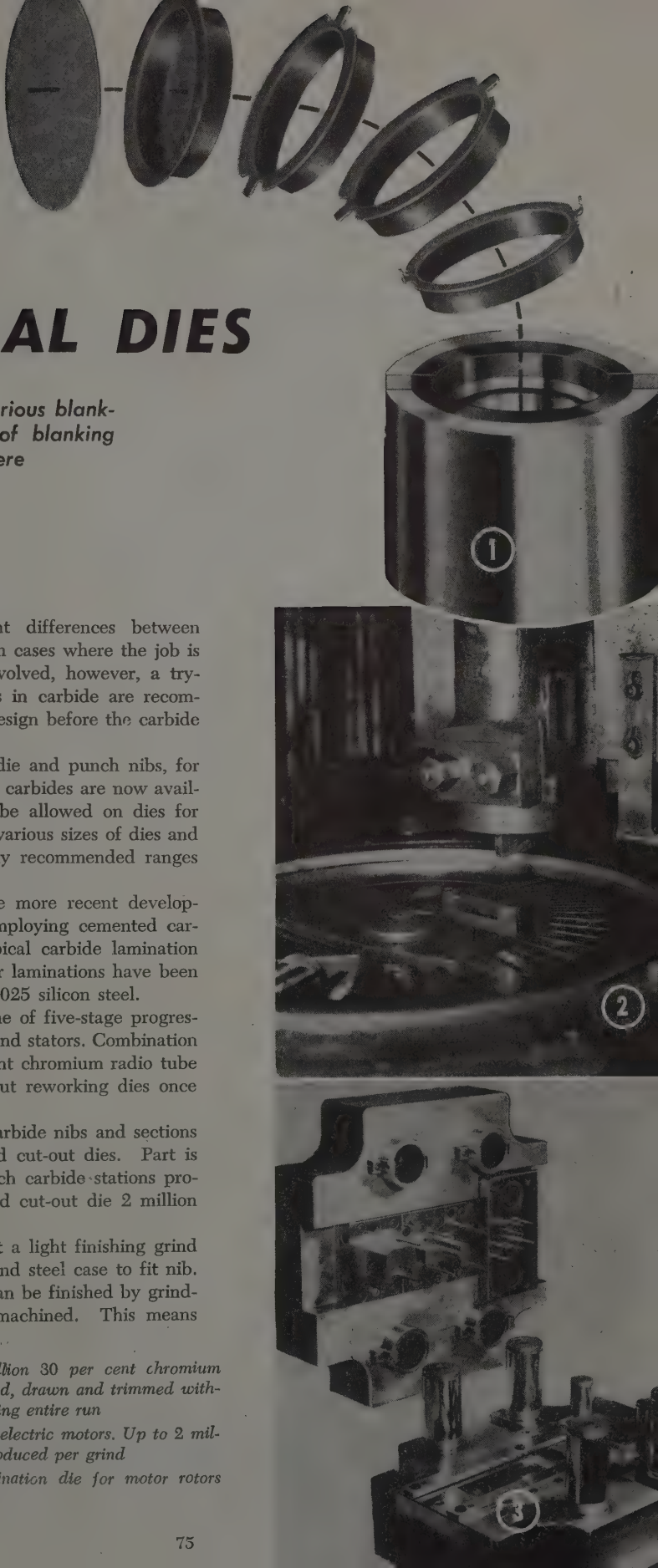


Fig. 1—Combination die on which 8 million 30 per cent chromium stainless steel radio tube parts were punched, drawn and trimmed without reworking dies once during entire run

Fig. 2—Typical carbide lamination die for electric motors. Up to 2 million circular laminations are produced per grind

Fig. 3—Five-stage progressive motor lamination die for motor rotors and stators

that segmental construction should be used for irregularly-shaped dies.

Bearing length—and therefore overall height of nib—can be made somewhat shorter. Good lengths are ⅛-inch for dies up to ½-inch inside diameter and up to ⅜-inch for dies with an inside diameter of 2 inches or over. Allow liberal back relief on exit side of bearing.

Outside diameter of nib equals bearing diameter plus from 5/16-inch to 3/4-inch per side for wall thickness depending on die size. Where bell openings are large, use bell opening plus 3/8-inch on diameter. For irregular shapes, use segmental construction for simplicity in finishing.

On cupping dies make the outside diameter of nib larger than outside diameter of blank to keep all wear-producing action on the wear-resistant carbide. For extremely heavy draws, as for "ironing" steel cups, the steel die case should be at least twice the outside diameter of the nib. On redraw dies, where cup is bottomed, extend the carbide nib below bottom of cup to provide a wear resistant lead for knock-out.

If carbide nib and case are to be ground after assembly, relieve the case below the nib prior to assembly so that grinding wheel will not touch the steel when grinding the carbide. For shrink fit dies, use SAE 4340 hardened to rockwell C 38 to 42. Carboloy draw die nibs are usually assembled in cases by shrink and press fitting in the normal manner. For segmental dies use shrink fit. Shrink allowances run from 0.0015 to 0.009 inch for dies from 1/2 inch to 6 inch inside diameter. Press fits follow the practice that is customarily used on steel.

In progressive dies, nibs should be finished complete to size before assembling. Use locating fixture for assembling. Use mechanical strippers with carbide draw dies. Although successfully used in some instances, stripping on the back edge is not generally recommended. Prime design factors applying specifically to blanking, piercing and notching dies are: Carbide is generally assembled to back-up shoe by mechanical means. This avoids necessity of brazing, gives solid backing to the carbide and simplifies attaching. Four methods of mechanically attaching nibs to shoes are available.

1. Cap screws through preformed, countersunk holes in the carbide.

2. "Through" hole in the carbide to accommodate a tapped section inserted by die manufacturer. These are anchored to prevent rotation.

3. Use of machinable inserts in preformed blind or through holes in the carbide. Drilling and tapping is by die manufacturer—to location; inserts are imbedded at Carboloy.

4. Clamping carbide to the shoe by using a steel ring fitting against a shoulder on the outside diameter of the carbide nib. Shoulder should be approximately 1/8-inch wide by approximately 1/4-inch high.

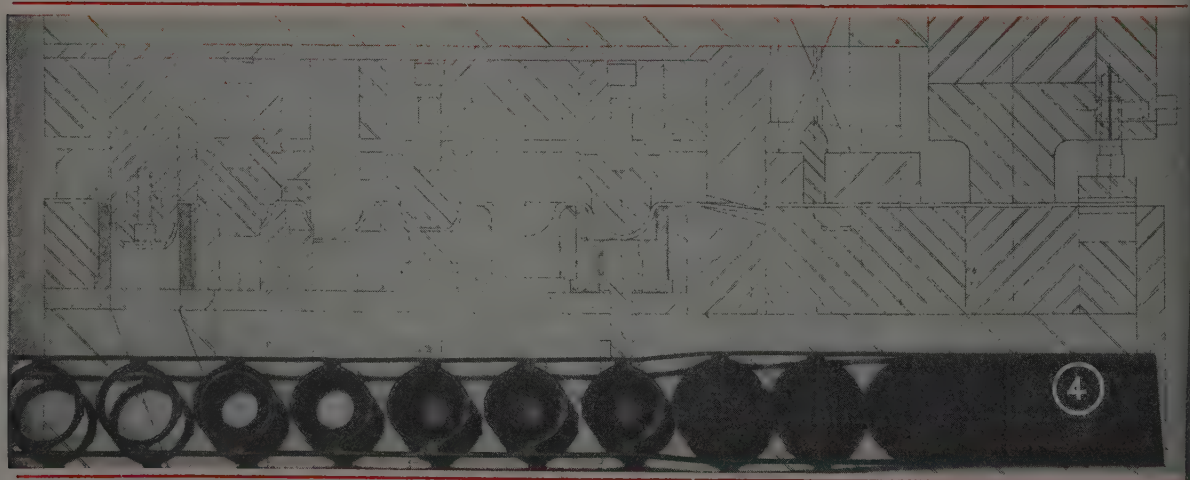
Special carbide grades (55A and 55B) are used for blanking dies. These grades have been specially developed for impact work of this nature, and are quite different from carbide grades used for cutting tools, for instance. Wall thickness needed for blanking dies depends on size of holes or inserts used. Minimum wall thickness is 5/16-inch, which corresponds to an insert size accommodating a No. 5 machine screw. For larger size inserts, correspondingly more stock has to be allowed around the insert. For a 3/4-inch stud or screw, minimum wall thickness would be 1-11/16-inches which allows 1/4-inch of stock around the insert. Usually it is better practice to use a large number of small inserts rather than one or two big ones.

Blanking dies may also be assembled if convenient by press fitting in the normal manner. Minimum stock thickness should be 1/2-inch, plus whatever is required for regrind, depending on quantity of parts that are to be produced.

Where two or more holes have to be held in relation to each other, dies should be made in segments and finished on mating faces to bring holes in proper relation. This is due to slight variations in shrinkage during hardening of the carbide with its preformed holes.

Shearing edges of carbide blanking or piercing dies should not be honed or touched up with a stone. Special caution should be observed that (*Please turn to Page* 109)

Fig. 4—Nine-station die block using carbide nibs and sections in fifth and tenth station, first forming and cut-out dies. Part is tie-rod bearing



Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

BY TELETYPE FROM CHICAGO: The big Machine Tool Show at last has materialized and it lives up to all expectations. The copy for this page is being written in Chicago—some of it at the show. I want to give a few flash impressions gained at first hand.

The Machine Tool Show in the Dodge-Chicago plant is the most "comfortable" show that I have ever attended. Primary factors contributing to this are: Good management and skillful organization of the whole project by the National Machine Tool Builders' Association and the management firm of Clapp and Poliak Inc.; a light airy and symmetrical building all on one floor; a wood block floor; uncrowded exhibit spaces, that is, with ample room between machines; no undue noise such as loud speakers and exhibitors overflowing with friendliness and useful information.

Well-Managed Machine Shop

There is nothing of the Coney Island midway about this show. Rather, it is in appearance and in spirit a huge, modern and well-managed machine shop, fully equipped —not with the machines and tools of yesterday, but with those of tomorrow. Unlike the ordinary shop, however, it does not "specialize" in certain types of equipment involved in certain types of work. This huge machine shop features every variety of metalworking equipment used in every kind of manufacturing, whether it be small work or large work, single parts or the manufacturing of parts by the millions.

There is no other shop in the world like this one which has been established for a "nine days' run" in the Dodge-Chicago plant. Many exhibitors and many visitors wish that its operating life could be extended beyond September 26, which is the final day of its life as a "going concern". Nine days is too short a time for complete absorption of the lessons of this show by any one individual. That task is something like the feats of those foreign visitors who write books about the United States based on visits of two weeks.

There is, unfortunately, little or no possibility that the period of the show will be extended. Therefore, the only answer is: Put more manpower on the information "absorbing job". Many companies are doing this, with the result that many visitors are living in the steamboats "North American" and "South American" which are tied up as "hotels" in the Chicago River.

MY VISIT WITH E. P. BULLARD: As far as I am concerned, the high point of Preview Day at the Big Show, September 16, was my visit and luncheon date with E. P. Bullard, chairman of the board of the Bullard Co., Bridgeport, Conn. Mr. Bullard talked about the future more than he did about the past, even though he is a veteran of more than 50 years of experience in the machine tool industry.

As to the future, E. P. Bullard is firmly of the belief that it is inevitable in this country—if not throughout the world—that human beings will not do things which machines can and should do. In other words, if pushbuttons can be substituted for levers on machine tools, pushbuttons there will be. Going a step further, he believes that on repetitive work and on form machining of various kinds, the machine tool will be made to "push its own buttons", so to speak—thus taking the mental as well as the physical load off the operator's head and shoulders.

Not only does E. P. Bullard believe in these principles, he has them embodied in the machines which he is showing. In some of these automaticity can be turned on or turned off depending on the nature of the jobs that are involved.

Mr. Bullard showed me some cartoons which he has had drawn to illustrate how the modern machine tools have developed beyond the ability of the human operator to cope with their demands at top speed, and how engineering can meet this situation. In the one cartoon, an operator is shown furiously pulling levers on a carbide-tooled vertical boring mill. As the foreman watches his struggles, the workman exclaims "Boss, I can't keep up with this machine at this rate!"

Automatic Programming Engineers' Answer

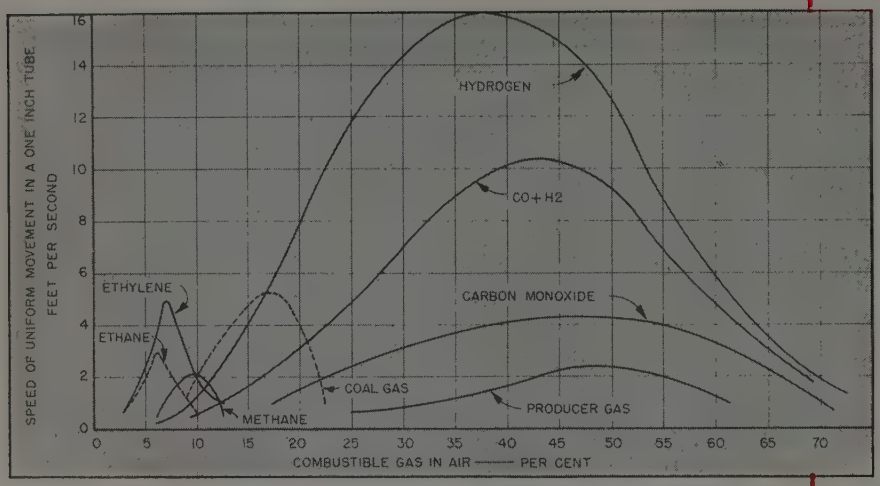
The other cartoon shows the engineer's answer in the form of several machines in which the control of operations has been transferred from man to machine by means of automatic programming prearranged to make use of top cutting speeds without lag between phases of the machining cycle.

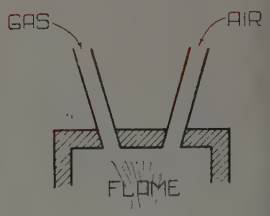
One operator oversees battery of machines in a supervisory capacity. These machines utilize to the utmost the 60 minutes in the old-fashioned 60 minute hour, and the operator earns his high wage as an expert supervisor of machines rather than as a mere puller of levers who becomes progressively less efficient as he becomes more fatigued.

So much for Mr. Bullard's practical visions of the future. Now for some of his recollections of the past. As we were eating lunch at a tavern at some distance from the show, he recalled some things about the famous Paris Exposition at the turn of the century.

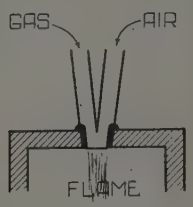
He was one of eighteen young American machine tool men who participated in that exposition and lived together on a typical Paris pension. Many of those eighteen young men lived to become leaders in the American machine tool industry. One of them, for example, is Clayton R. Burt, chairman of the board, Pratt and Whitney, division of Niles-Bement-Pond Co., with whom I had a friendly visit at the Chicago show on September 16.

What does the future hold for the ambitious young fellows who are cutting their eye teeth at this Chicago Machine Tool Show? Will history repeat itself?

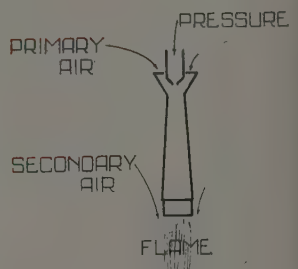




I SEPARATE AIR AND GAS ENTRANCE TO COMBUSTION CHAMBE



II NOZZLE MIXING



III PARTIAL PREMIXING WI OPEN BURNERS

CHARACTERISTICS OF BASIC

Gas Combustion Equipment

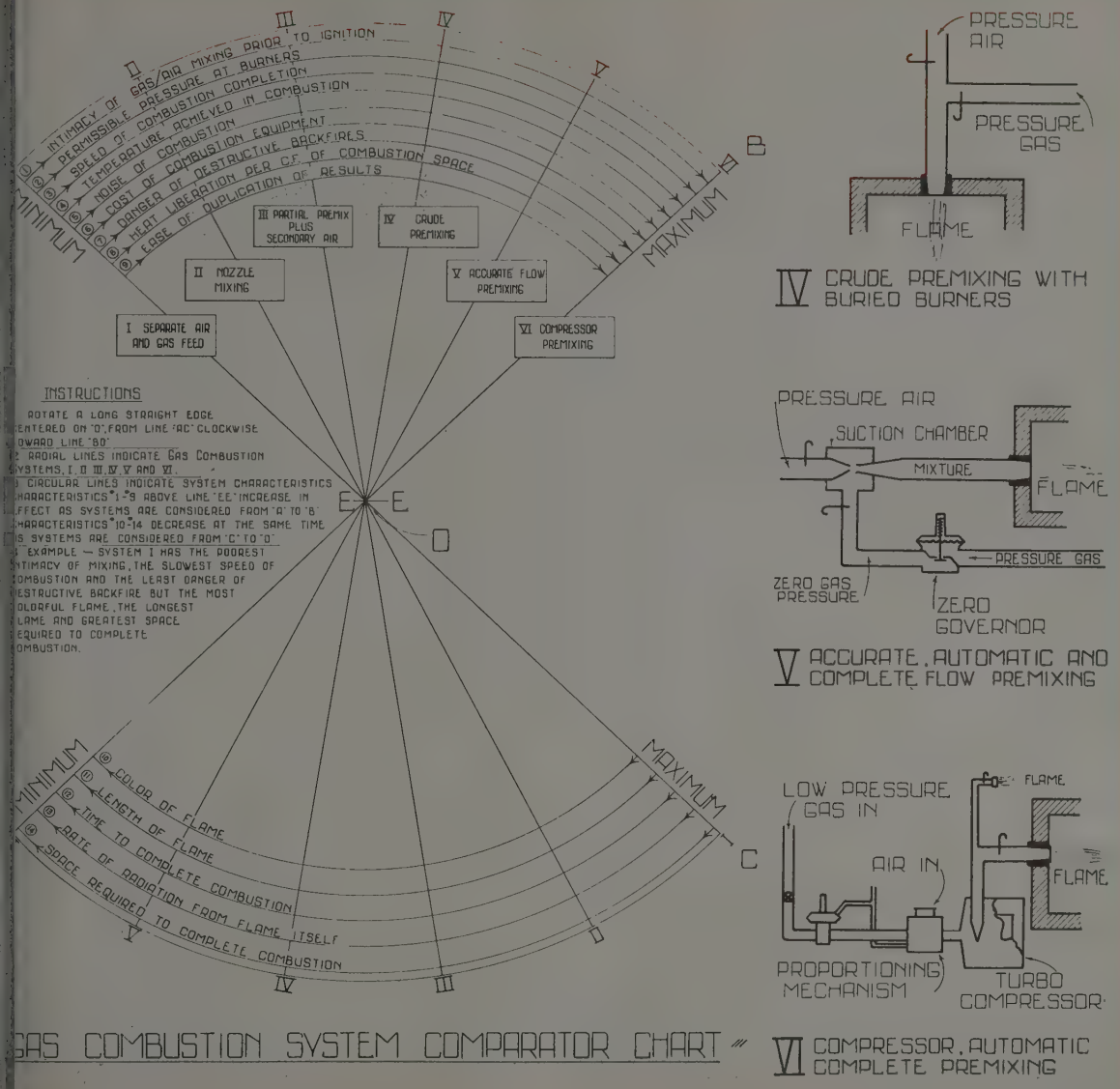
In this discussion of fundamentals, the author compares techniques and defines terms, presents formulas applied to design and use of various kinds of mixers and burners for industrial installations

AS ALL gas combustion involves mixing of gas and air, it is plain that the method of mixing must be important. It is so important that there are literally hundreds of patents on gas/air mixtures and mixing devices. Many manufacturers make such devices under many trade names, so the user has thousands of items from which to choose.

However, all combustion systems fall into six fairly distinct classifications. These are: 1. Separate air/gas entrances into combustion chamber; 2. nozzle mixing; 3. partial premixing with open burners; 4. crude premixing with buried burners; 5. accurate, automatic, and complete flow premixing; 6. compressor, automatic complete premixing.

Each of these general combustion systems has certain important individual characteristics; when studying a particular application each of these characteristics must be given consideration. Also, their effect on other factors and results should be evaluated. To secure a given result which will exactly meet specification, the combustion engineer must know not only what type of system to use, but exactly what combination of the various pieces of equipment making up that system will most exactly meet the requirements.

The small school boy painting his first color picture knows only the primary colors. The famous artist, however, can accurately differentiate between hundreds of color shades to put onto his canvas exactly the right shades



IV CRUDE PREMIXING WITH BURIED BURNERS

V ACCURATE, AUTOMATIC AND COMPLETE FLOW PREMIXING

VI COMPRESSOR, AUTOMATIC COMPLETE PREMIXING

Fig. 1 (left)—Speed of uniform movement of flames of various gases in air

Fig. 2 (above)—Gas combustion system comparator chart

By D. A. CAMPBELL
Manager of Industrial Division
Bryant Heater Co.
Cleveland

to make it a masterpiece. The average gas user merely knows that gas burns. He looks to the combustion engineer to give him the masterpiece that will do his heating job as he wants it done. During the past 10 to 15 years some of the results accomplished have been far ahead of the fondest hopes of the user. Let's discuss the six general combustion systems.

System No. 1: Simplest system of combustion known is a crack in the earth from which natural gas issues and becomes ignited in some manner. An improvement would be a pipe with a valve to regulate the flame size. Now, if we point this flame into a chamber, closed except for a flue, and if we allow enough air to get into the chamber around the gas pipe and keep enough draft going through the furnace and out through a flue, the flame will probably keep burning.

If we supply a pipe for air near the gas pipe and by use of blower force air into the furnace, we begin to have a combustion system. Using valves and careful manipulation, we can work the furnace temperature very high and put sufficient pressure in the furnace to be quite independent of draft. Independent gas and air entrances into a furnace, either dependent or independent of draft, constitute the simplest and one of the oldest combustion systems. Glass tanks, open hearth furnaces and similar applications commonly use this system. Refinements, such as gas and air preheating and reversing cycles, improve control and economy. (*Please turn to Page* 103)

1
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Casting STEEL MILL ROLLS

MAKING steel mill rolls is a highly developed speciality, combining science and art, with emphasis on the latter. The science component is metallurgy; the art—practical experience. The accompanying photographs tell the story of how iron and steel rolls are made at the plants of Mackintosh-Hemphill Co., Pittsburgh.

Practically all rolls, whether iron or steel are cast. First step in making a cast steel roll is the construction of the mold into which the molten metal will be poured. Fig. 1 shows two halves of the mold for a large blooming mill roll; these are formed inside steel forms called flasks. Iron half-rings, or chills, are placed in the flasks where the ridges are seen. These cause molten metal poured next to them to cool faster and improve grain structure of the steel so that the surface later can be hardened better.

Special high-silica sand is shaped to form the finished mold, about 1/2-inch of sand covering the iron chills. A sweep, outline of which is similar to the contour of the roll, is used in shaping the sand in the flask. The smooth surface is then coated with a dressing, the two half-flasks dried in an oven and then clamped together. Molten metal is poured through the two holes when the completed flask is stood on end. Since metal comes into the mold in a swirling molten from the bottom, large-headed nails are driven into the sand to keep it from being torn loose.

Fig. 2 shows flask being lowered into the pit for pouring in a vertical position. Some rolls are so large that the mold for the sinkhead is not added until after the flask is in position. Sinkhead supplies excess metal at top of mold to take care of shrinkage of the metal as it changes from a liquid to a solid.

All rolls are bottom poured, that is, the metal enters the bottom of the mold and rises to the top. Actual pouring, however, is done from the top as illustrated in Fig. 3. A lever lifts plug from hole in bottom of ladle and metal flows down the

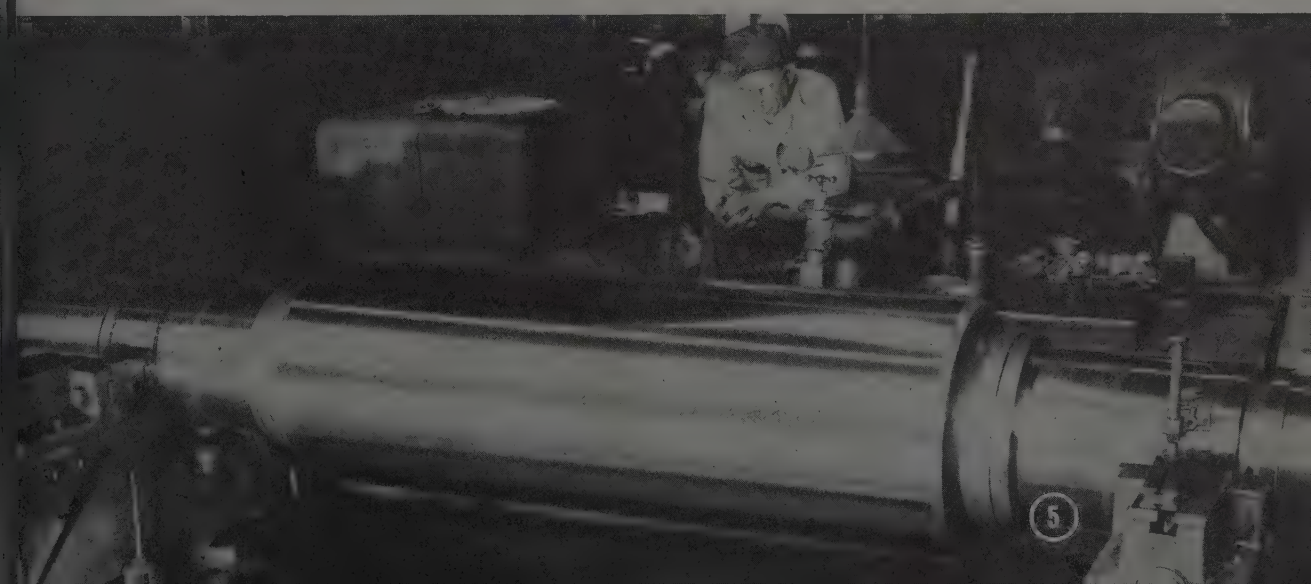
Fig. 1—Two halfs of mold for large blooming mill roll

Fig. 2—Flask being lowered into pit for pouring in vertical position

Fig. 3—Pouring a roll. Plug from hole in bottom of ladle is lifted and metal flows down runner inside flask proper

Fig. 4—Pneumatic hammers are used to chip adhering sand from roll surface

Fig. 5—Grinding roll surface to mirror smoothness



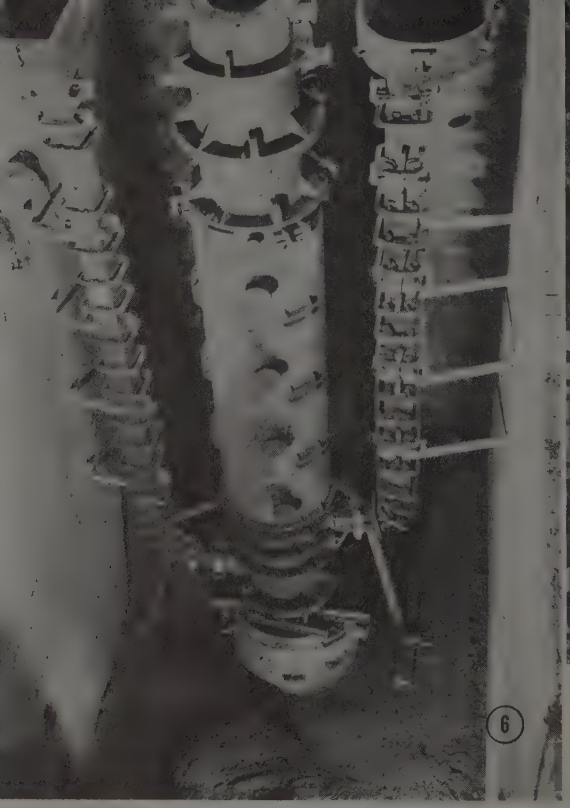


Fig. 6—Mold for large plate mill iron roll is assembled and placed in pit ready for pouring

Fig. 7—Pouring a series of small rolls

Fig. 8—Molten metal is poured into two runners at the same time

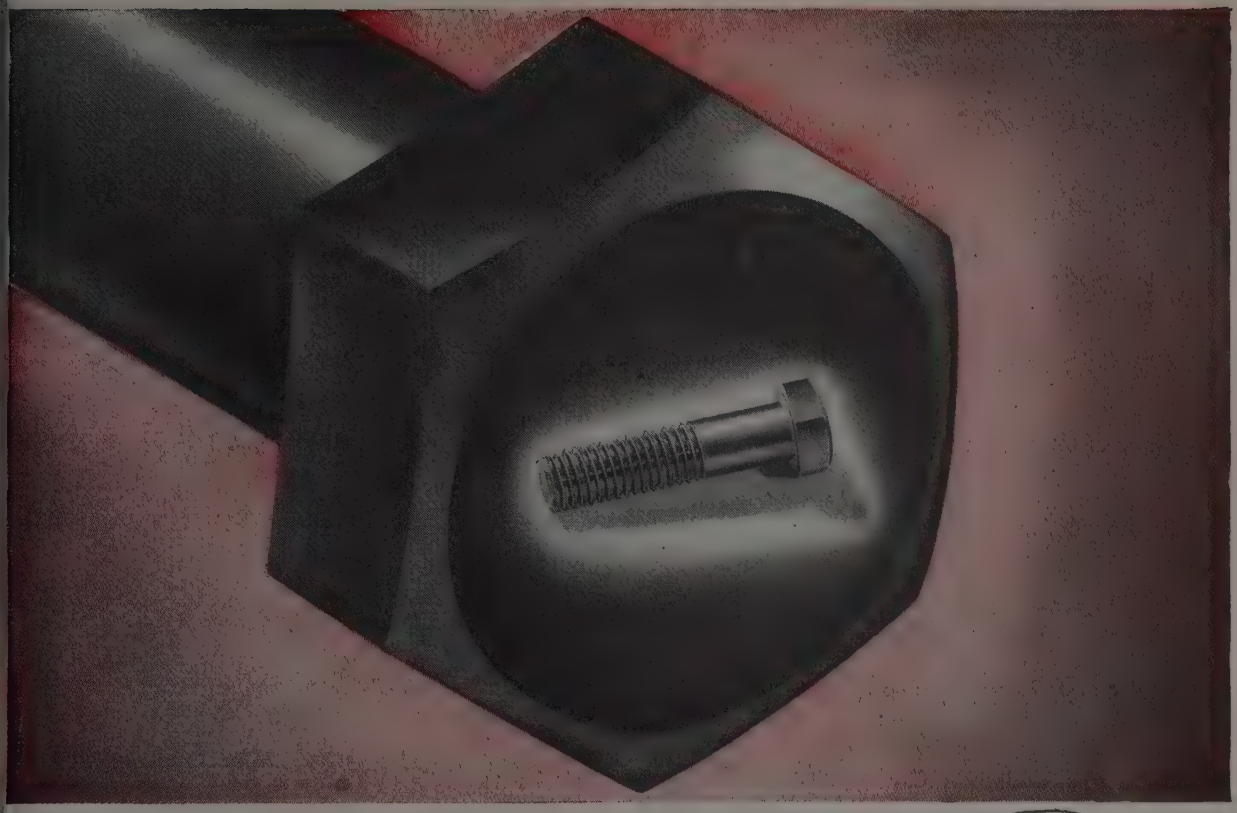
runner inside flask proper and enters the flask through gate at bottom. Centrifugal motion of metal as it enters keeps outer surface of metal in the mold free from sand and slag which rises upward on the surface and is deposited in the sinkhead.

Large rolls take several hours to congeal and often more than a week to cool enough so they can be handled. The roll is then removed from the sand mold and taken to the chipping floor where pneumatic hammers chip adhering sand from the surface, Fig. 4. After the surface is cleaned the roll is annealed.

Roll is then rough machined and returned to the oven to be brought again to red heat. Taken from the oven, necks and wabblers, or couplings, are quickly covered so they will cool slowly, while the surface of the body is immediately air quenched to cool that part quickly. After this treatment the roll is put in a huge lathe and the necks, wabblers and body surface machined to exact dimensions. Final operation for rolls that must impart a high finish to the product, is the grinding of the surface to mirror smoothness as shown in Fig. 5.

Techniques used in making iron rolls are fundamentally the same as for steel, but there are some important differences. Pig iron and scrap for iron rolls are melted in an air furnace, somewhat different than an open hearth furnace in which steel is made. Chemical composition is known for each piece of scrap as well as for the pig iron.

(*Please turn to Page* 112)



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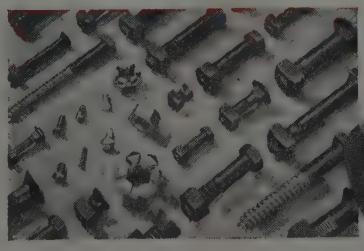

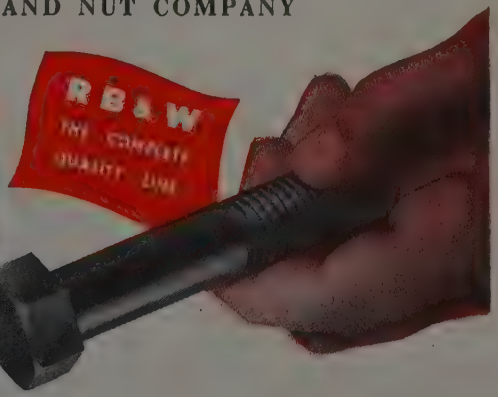

Engineering News *at a Glance*

STUDIES DRAG PROBLEM: If flow of so-called boundary layer, thin layer of air that clings to the outer surface of an airplane in flight, can be kept smooth and orderly, present drag of jet airplanes may be cut as much as 15 per cent, according to the National Advisory Committee for Aeronautics, Washington. Such a reduction would mean 15 per cent less power requirements and a direct increase of 15 per cent in range. One method under study for smoothing air layer involves use of suction to remove a small amount of the layer next to the plane. This would require using the air intakes to the jet engine to draw air in through slots in the wing to remove the boundary air where desired.

THICKER PLATING: Process for electroplating which markedly reduces polishing costs as well as providing an electrodeposit of great smoothness, increased density and decreased porosity is announced by Hanson-Van Winkle-Munning Co., Matawan, N. J. A development of Westinghouse Electric Corp., the process involves a novel, periodic reverse plating cycle in which plating current is reversed briefly at short intervals. The New Jersey firm is now preparing to issue licenses for electroplating method as well as to engineer complete industrial installations involving its use.

MORE REAR-END DRIVE: Propulsive thrust of hot gases blasting from the tailpipe nozzles of jet engines are boosted as much as one third by an "after burner" devised by Ryan Aeronautical Co. for the Navy's Bureau of Aeronautics. Added thrust is accomplished by spraying more fuel into the tailpipe where its burning adds greater mass and velocity to gases already in the jet exhaust stream. Reported to be the first American "after burner" developed, the unit will enable pilots to use the added push to drive their planes through the compressibility barrier as flight approaches speed of sound. It also can be used to provide added power on take offs.

SUBSTITUTED ZINC WIRE: Zinc alloy wire was used in Germany to a large extent as a substitute for copper or aluminum wire according to a report received by the Office of Technical Services, Washington, from the British Intelligence Objectives subcommittee. Wire was produced almost entirely by rolling down cast bars to rod form then drawing it. The process is reported to be cheaper than first extruding and then drawing. One method in use at one plant consisted of first casting circular disks which were rolled in about 8/10 centimeter thickness and 1 meter diameter. The rolled disks were then cut up spirally into rough 8/10 centimeter square rod which later was drawn down to wire.

SHIPS FURNACES BY WATER: In moving its gas tube annealing furnaces from its Tennessee works to its new 43-acre sheet and plate rolling mill at Davenport, Iowa, Aluminum Co. of America is circumventing costly assembly and renovating charges by shipping the 19 x 15 x 36-ft units via river barges. The giant structures are lined with aluminum foil insulation. Disassembly and sectional shipment by rail would have destroyed the foil insulating properties of the furnaces, requiring complete rebuilding on their arrival at the new mill. First four of the eight furnaces already have begun their 3 to 4 week, 1179-mile river journey in two 150-foot barges.

BIG MOVING JOB: Transporting machines from the unloading platform to the Machine Tool Show area presented a full scale moving problem for Pennoyer Merchants Transfer Co., Chicago, which handled the drayage. One machine alone, for example, was 13 x 10 x 10 ft in size, weighed 115,000 pounds and had 32 motors. Another towered to such a height that it was above the ceiling light fixtures, and nearly reached the roof. Hundreds of trucks, tractors, trailers and more than 50 pieces of big special-purpose materials handling equipment were "drafted" for the setup job.

TO CHANGE NAME: In Chicago, it was learned, American Industrial Radium and X-ray Society will be known as the Society of Non-Destructive Testing following its annual meeting during the National Metal Congress & Exposition, Oct. 18-24. According to Philip D. Johnson, national secretary of the organization, name of the society's publication also will be changed at the time. It will be known as "Non-Destructive Testing."

KAISER TEST SUCCESSFUL: At Fontana, Calif., the Kaiser steel blast furnace recently successfully completed its first run on Eagle Mountain ore. According to reports, results exceeded best hopes of the operators. A small percentage of the ore was first put on the furnace June 10, and the proportion steadily increased until June 16, when 80 per cent of the burden was composed of Eagle Moutain ore—either as raw ore or as sinter produced from the ore. This percentage was maintained until completion of the test run June 27, except for 2 days when 100 per cent of the mountain's ore was charged. Total quantity of ore used amounted to 30,000 net tons. It is believed by the company that this ore can be mined and delivered at Fontana at an Fe unit cost that is less than the corresponding cost for any other ore delivered at any other plant in the country. The ore is expected to be available for steady use in quantity sometime next spring. It also is believed the amount of ore actually present in the area will exceed 70 years' supply.

JACK OF ALL TRADES: In Philadelphia, Selas Corp. of America, departing from its custom-tailoring practice, is now producing a ready-made job which seems to be a jack of all trades. It is a gas heat treat table that anneals, hardens, silver brazes, soft solders and performs other heat treating operations. It is ready for action the moment gas and electrical connections are made.

GAS-SHAPING ICE CUBES: Ice cubes are cut with gas by a cuber currently manufactured by Thermo Cuber Co., Chicago. According to American Gas Association, it's probably one of the safest ice cubing machines in existence. In action, the ice block, moving by gravity along an inclined stainless steel bed passes first through a vertical slabbing grid through which a steam or hot water line is run, and then through a horizontal cubing grid. Gas water heaters or steam boilers provide heat necessary for the operation.

FINISHED TO LAST: Finishes that retain their original tonal values and degrees of reflectiveness for many years are incorporated on elevator interiors that leave the Harrison, N. J., plant of Otis Elevator Co. Here, panels are first Bonderized, then they are hand-rubbed with sandpaper and gasoline. This insures smooth finish and is repeated two to five times, depending on number of coats of lacquer applied. As many as six coats of lacquer are used on the interior panels, canopies and doors. The company uses a flat finish for canopies with direct lighting; for indirect lighting, it uses one coat of flat lacquer over three of pigmented lacquer. Panels and doors are given either semi or high-gloss finishes. For the semi-gloss, three coats of pigmented lacquer are used and, for high gloss, the company applies three coats of pigmented lacquer plus three of clear lacquer.

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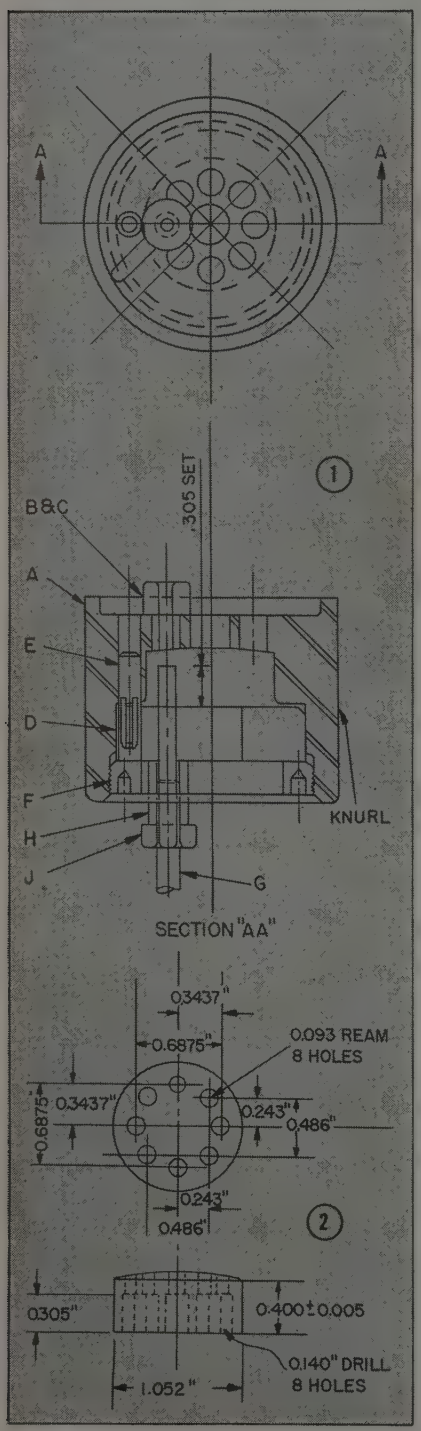
LOCATING HOLES ACCURATELY WITH A

By ROBERT MAWSON

Precision Drilling Jig



FUNDAMENTAL principle of a drilling jig is to produce parts accurately so that they can be used interchangeably either when building the original machine or when used for repairs.

As the pieces machined in a drilling jig can never be more accurate than the jig itself it is necessary that precision workmanship be employed when building any special manufacturing equipment. Sometimes, tool problems are presented to a company making these special tools which call for the most extreme accuracy and to produce the equipment calls for a combination of high grade engineering skill with the most modern tool building practice.

An example of this type which demanded engineering skill and precision tool work performed on modern equipment was recently received by Sandsea Inc., Providence, R. I. This order was to design and make a drilling jig to machine the special plug shown in the Fig. 2. Referring to the drawing it will be noticed that the allowable limits on the piece are very close and further it will be seen that the eight 0.140-inch holes must be in exact alignment with the eight 0.093-inch reamed holes.

Drilling jig designed and built to perform these operations is made with a tool steel body A which is carefully machined and then hardened and ground. Two tool steel slip bushings are made for the jig body, both hardened and ground after being machined. The bushing B is made to guide the No. 44 (0.086-inch) drill and the bushing C is made to guide the 0.093-inch reamer. A handy medium is provided with the slip bushings for placing or removing them from the jig body which consists of a piece of ⅛-inch square cold rolled steel bar soldered on the flange of the bushing.

Drill guide plate D is made of tool steel machined, hardened and ground to be a good sliding fit in the jig body. In the jig body and guide plate is machined and then ground, in perfect alignment, a 3/16-inch hole to suit the locating pin E which is made from steel drill rod and hardened to resist wear. After the guide plate D has been placed in the jig body it is held in place with a nut F which is made from cold rolled steel, carbonized and hardened.

For machining the eight 0.140-inch holes a special tool has been designed consisting of a shank which is machined to 0.140-inch diameter and a cutting edge formed at the end. This tool is shown as G. On this tool is also machined a thread to fit the nut H. When using this tool for the drilling operation the nut is screwed onto the shank and then fastened with the hexagonal nut J as shown in a position so that the drilling end of the tool will project 0.305-inch past the upper face of the guide plate. In other words the tool will machine a hole 0.305-inch deep in the plug being machined.

To use the drilling jig, the special plug (Fig. 2) to be machined is placed inside the 1.0532-inch hole in the jig body. The drill guide plate D is then placed behind the special plug, the nut F being screwed into the jig body, holes being provided in nut so that a spanner wrench can be used to tighten the nut.

Piece is now held securely in the drilling jig and the guide plate is also in its correct relative position, as determined by the locating pin E, ready for the machining operation. The drilling jig is now placed on the drill press table in the position as shown in drawing, but with the detail G removed from jig.

Eight 0.086-inch holes are now machined, the drill being guided in the slip bushing B. This bushing is then removed and substituted with the slip bushing C and the eight drilled holes are reamed. The slip bushing is removed from the jig and turned over so that the upper surface is resting on the drill press table. With the jig in this position the eight 0.140-inch holes are drilled, the correct depth of the holes being determined by the inner edge of the threaded bushing on the tool G coming in contact with the face of the guide plate D. It will be noticed that the outside of the jig body has been knurled to provide an easy and positive method of holding.

To remove the finish machined piece the nut F is first removed from the jig body and after this has been removed the drill guide plate will drop out of the body. The operator now pushes the piece out of the jig body by means of a round pin placed in the 5/16-inch hole in the center of the body.

This drilling jig met all the requirements of this rather difficult machining problem because the locating and drill guide members are positive in their positions.

The size accuracy, surface finish and improved physical properties of Cold Finished flats make them applicable for many uses without extensive machining. They are economically made into slides for machine tools, parts for jigs and fixtures and molds for rubber and plastic. J&L Cold Finished flats are available in a variety of grades—in sizes from 6″ to 15″ from your nearest J&L Warehouse or distributor.

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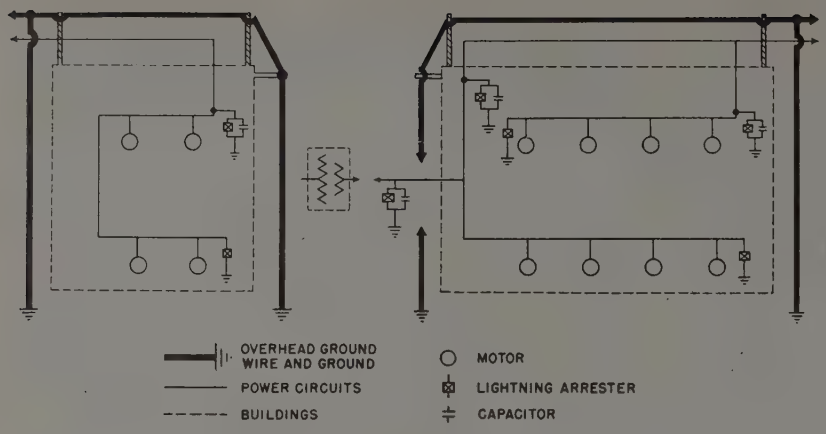


Lightning Damages

. . . HOW TO PREVENT THEM

LIGHTNING may cause damage in industrial plants even though the bolt does not actually strike the buildings, the surges produced by near misses on the buildings or electrical circuits causing damage as costly as if the machinery were the target itself, according to Edward Beck, manager of lightning arrester section, Westinghouse Electric Corp., East Pittsburgh, Pa.

Proper preparations against lightning troubles involves protection against surges to machinery and apparatus and sometimes against direct strokes to buildings and electrical circuits. The source of power of a transformer supplied from a transmission or distribution circuit must be safeguarded as well against outages from either direct strokes or other surges. The usual industrial-type, low-voltage circuits operating at less than 1000 volts can be protected as adequately against lightning as the higher-voltage transmission lines and generally with less protective equipment.

Major problem in industrial plants is not so much the protection of the buildings themselves but rather protection of the many motors and control devices connected to the electrical circuits. Arresters and capacitors should be installed wherever the circuits leave the building. If the circuits in the building are radial, the remote ends of the circuits should be equipped with arresters to prevent the building up of voltage by reflection at the end of the line.

Protection advisable in a plant where the circuits pass out of the buildings in open wiring is shown in the accompanying diagram. It is assumed that the plant is located in a region of high lightning frequency and intensity. Overhead ground wires also are shown. These may be necessary if the outside circuits are of any extent.

The most important factors in the location of ground wires are: 1. They must be placed so that they and not the power circuits will be struck; 2. sufficient insulation must be maintained between the ground wires including their down leads and the power circuits to prevent back flashes to the circuits when the ground wires are struck; and 3. ground resistance of the down leads must be low.

In general, if the three wires of the circuit are close together, a single ground wire 4 feet above the circuit will provide good shielding. Four-foot clearance should be maintained between the ground wire and its down leads and the power circuits. This can be accomplished by supporting the ground wire on wood poles and bringing the down leads off at an angle. If the circuits run over a metal roof which may carry lightning currents and are insulated only with small insulators, it may be necessary to increase the insulation in order to avoid back flashes.

Frames of motor and switchgear should be connected to a good ground such as a water pipe system and all lightning arrester grounds be tied to the same ground. For the down leads from ground wires, there should be separate driven or buried grounds and these should be connected with the plant ground.

Insulation of rotating machines is exposed to damage in two ways. High voltage from winding to frame may damage it or voltages between turns may cause turn-to-turn failures. Surge voltages caused by lightning may rise at very rapid rates, and when penetrating motor or generator windings, the rapid rate of change causes voltage between turns. The quicker the change in voltage, the higher the voltage between turns. In order to protect a machine, both the voltage to ground and the rate of rise of voltage applied to the machine terminals must be controlled. The voltage to ground can be limited by lightning arresters, and the rate of rise of voltage is limited by capacitors connected from the machine terminals to frame and ground.

For the most effective protection, the best practice is to install the protective devices as close as possible to the apparatus to be protected. This is the rule especially for systems where the apparatus is more or less widely separated.

All-metal buildings with roof and walls electrically well connected and grounded, and buildings with metal roofs and masonry walls with metal reinforcing electrically well connected and grounded may be struck by lightning but there is little risk of any physical damage or fire because the lightning current is conducted to ground through the metal without causing high voltage drops in the structure. It is important that the metal parts be well connected together so that no high voltages or actual sparks develop that might cause damage.

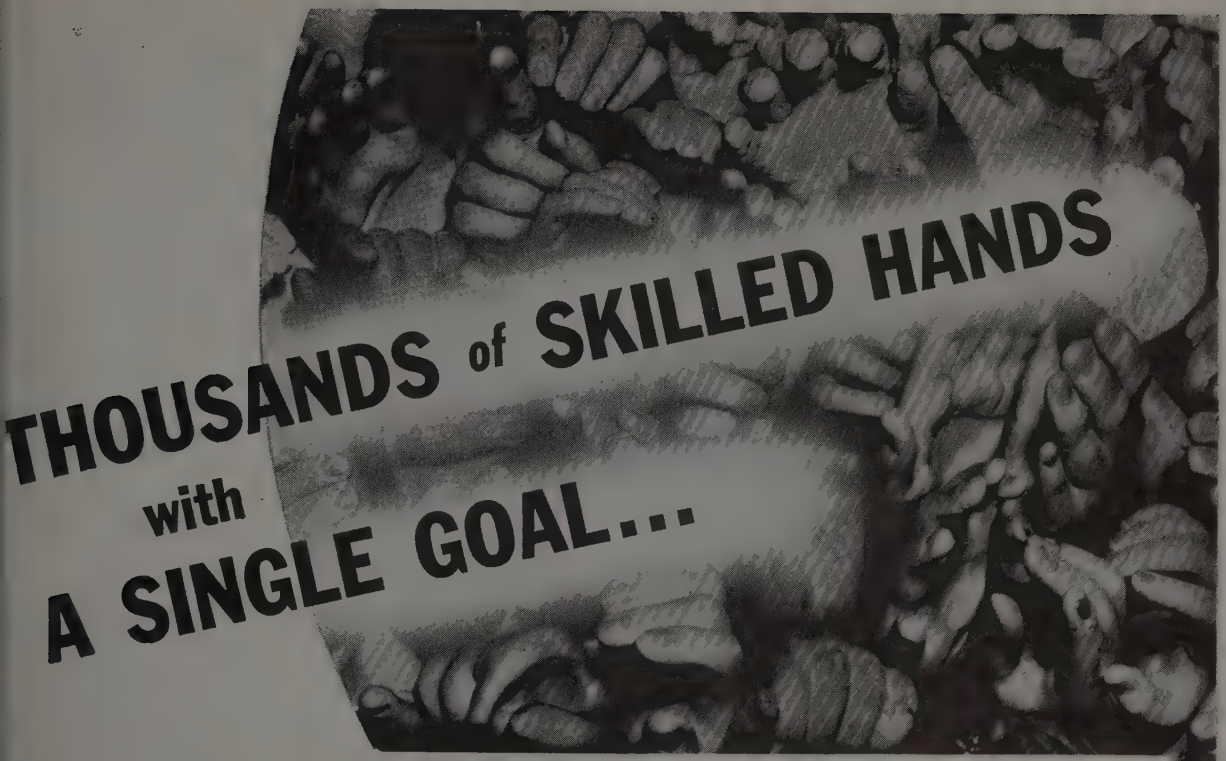
Electric circuits wholly contained in such buildings can be said to be practically free of dangerous overvoltages either from direct hits or from induction from nearby strokes.

If they pass outside the building, they may be struck by lightning or raised in potential by induction from nearby strokes. These voltages then will get inside the building by way of the wires to cause trouble.

Film Shows Use of High Speed Camera

Entitled "Time Magnification," a new 16 mm silent film illustrating the use of high speed motion pictures to study swift, blurred or transient action, has been released by Eastman Kodak Co., Rochester 4, N. Y. It includes sequences in both black-and-white and color taken with the Eastman high speed camera, type III, at speeds ranging from 1000 to 3000 frames per second. Projected at the normal silent speed of 16 frames per second, these "slow down" the action by factors as great as 187 times.

Shown, among other subjects, are a riveting machine, high speed cutting tools in operation and an electric welding arc, the latter sequence in color. The film, designed for showing to technical, engineering and industrial groups concerned with the problems of analyzing motion too fast for the human eye to record, is available on a free loan basis and has a running time of 17 minutes.



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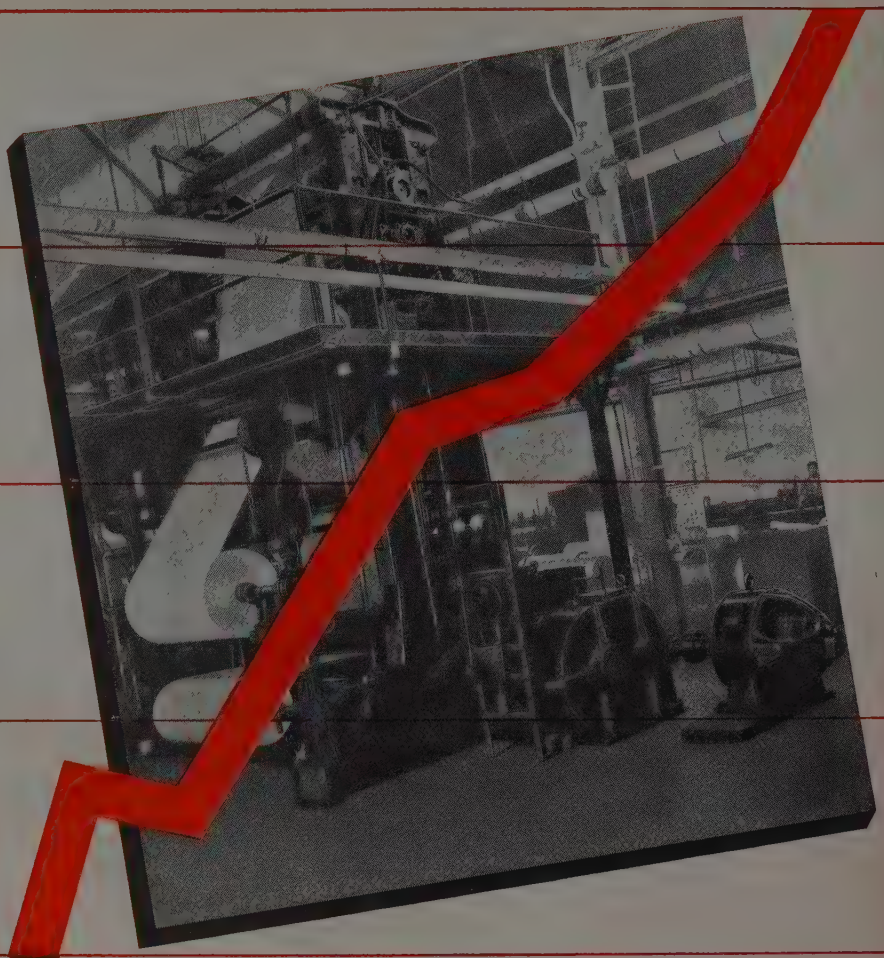

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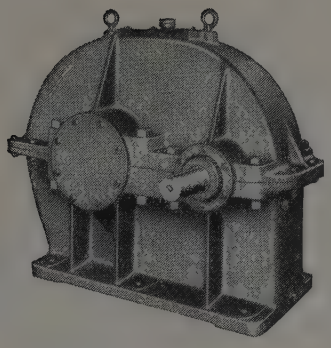

This Type SH speed reducer is a single-reduction unit which is furnished in thirteen standard ratios in each of twelve sizes. The Type DH speed reducer, which is a double-reduction unit, is offered in fifteen standard ratios in each of twelve sizes.

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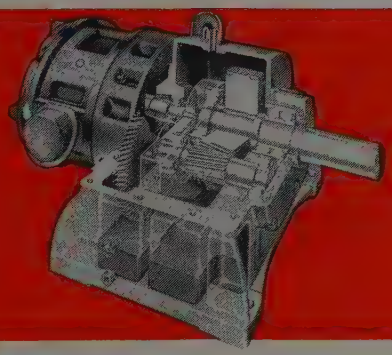

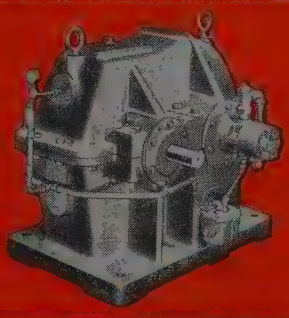

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Direct-Reading Device Provides

Rapid Steel Analysis

Quantitative analysis report for eight elements is obtained with a spectrometer within 40 seconds after sample is placed in electrode holders. Results reported to melt shop in 5 to 6 minutes after test is taken

By E. R. VANCE
Chief Chemist
Timken Roller Bearing Co.
Canton, O.

AIM of control laboratories of the hot metal industries is forever toward faster methods to maintain closer control of the molten bath while refining.

In spectrographic analysis the errors associated with the photographic plate have long been recognized and various methods have been adopted to minimize them. For some years, attempts have been made to employ direct-reading methods by substituting a photomultiplier tube for the photographic plate. Recently installed direct-reading spectrometer, furnished by Baird Associates, Inc., Cambridge, Mass., is the first installation to be used for the analysis of steel, and is the last word in speed, surpassing the wildest dream of the analyst. No longer necessary are the spectrum analysis plates, dark room, densitometer and calculation board, since the photographic stage of the process is replaced by direct photometric devices.

A quantitative analysis report of eight elements is obtained within 40 seconds after the sample has been placed in the electrode holders. It is possible to report desired elements to the melt shop in from 5 to 6 minutes after a test is taken. Savings in time will enable the melters to proceed with heats and eliminate the customary delay caused by time consuming analysis.

All preliminary and final tests from the melting department are being handled by one man on each 8-hour turn. Determination of carbon, phosphorus, and sulphur must be made in the chemical laboratory. Since practically no supplies are required for the spectrometer, a decided savings in chemicals and glassware should result.

Samples used for testing are steel pins, 7/32-inch in diameter, cast on the end of a regular block test that is drilled for elements which are run in the chemical laboratory. They are cut from the block test with a high-speed cutting wheel, properly identified and sent to the laboratory in a pneumatic tube system. Pins are ground to a point, having an included angle of 135 degrees, then placed in the electrode holders and the power turned on. A preburn period of 10 seconds is followed by an exposure of 16 seconds.

The emitted light passes through a lens and entrance slit and with the aid of a mirror is bent at an angle of approximately 45 degrees, where it falls on the 3-meter, focal length grating, ruled 15,000 lines per inch, which affords a dispersion of 2.8 A° per millimeter for the spectral region of 2800 to 4400 A° in the second order. Radiated light then passes through exit slits, one for each element, where it is reflected by a mirror on to the respecitve photomultiplier tube. These tubes generate a photocurrent, proportional to the amount of

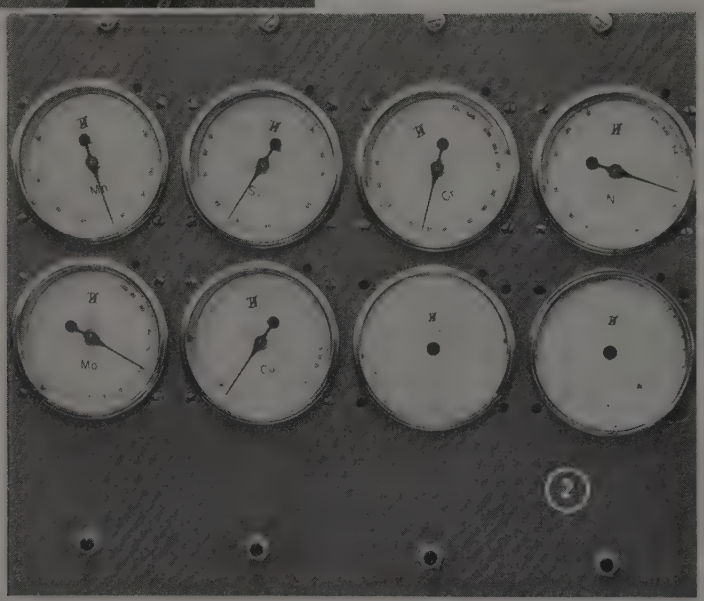
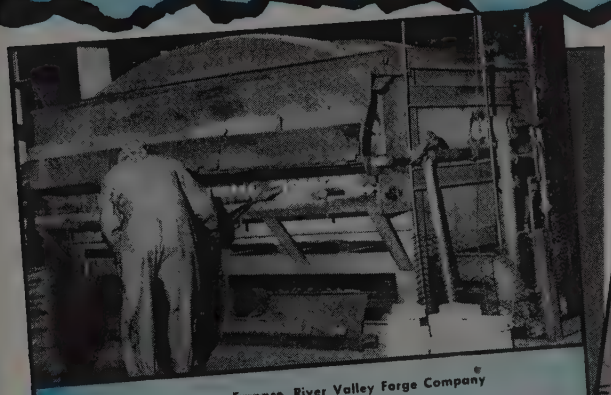


Fig. 1—Inserting pins in electrode holders

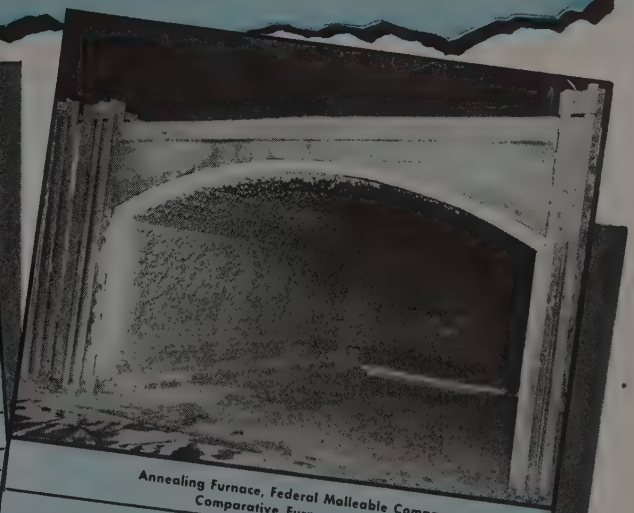
Fig. 2—Closeup of calibrated clocks on which percentage of element is indicated

Follow These Leaders To Lower Production Costs With B&W Refractories



Large Forge Furnace, River Valley Forge Company
Comparative Furnace Tests

	Standard Firebrick	B&W I.F.B.	Change With B&W I.F.B.
Furnace Output, pieces per hour	70	100	+43%
Heating-Up Time, minutes	210	35	−83.3%
Cycle Time, minutes	50	30	−40%
In addition: Fuel consumption during heating up			reduced 83%
Fuel consumption during operation			reduced 50%



Annealing Furnace, Federal Malleable Company
Comparative Furnace Test

	Standard Firebrick	B&W I.F.B.	Change With B&W I.F.B.
Heating-Up Time, hours	52	31	−40%
Total Cycle Time, hours	131	114	−13%
Fuel Consumption, lbs./cycle	12,792	8,159	−36%
Yearly Output, tons	946	1,100	+16%

Pretzel Oven of Baking Company
Production Record

	Standard Firebrick	B&W I.F.B.	Change With B&W I.F.B.
Heating-Up Time, hours	7	3	−57%
Baking Time, minutes	6	3	−50%

Annealing Furnace in Small Steel Plant
Production Record

	Standard Firebrick	B&W I.F.B.	Change With B&W I.F.B.
Total Heats per Month	21	41	+95.5%
Gals. Oil per Heat	194.7	143.5	−26.3%

Suspended Roof of a Billet Heating Furnace
Production Record

	Standard Firebrick	B&W Juniors	Change With B&W Juniors
Steel Output, tons	45,000	207,000	+360%

These typical case histories show how progressive furnace operators throughout the country are cutting production costs by specifying B&W Refractories—for every type of industrial furnace.

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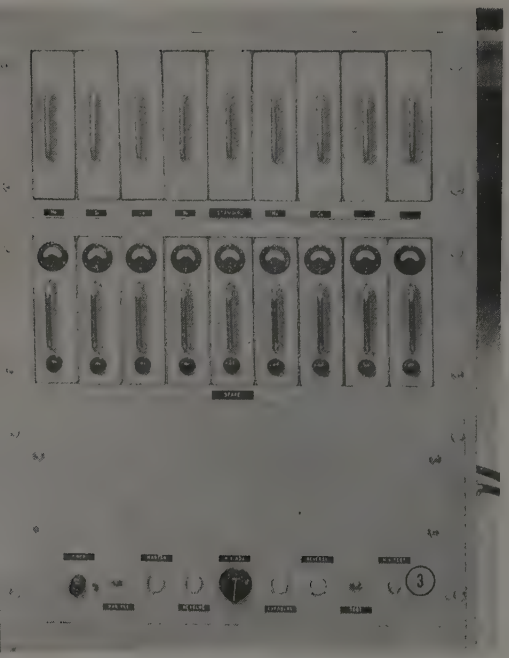

Fig. 3—Closeup of electronic panel showing condenser and amplifier drawers

Fig. 4—Spectrometer installation in Timken laboratory

light striking them, which charges a condenser until the exposure is complete.

The condensers are discharged through fixed resistors and a measurement is made of the ratio of the voltage of the unknown element condenser as compared to a standard iron condenser. An increase in sensitivity is obtained by passing current through an amplifier circuit, one amplifier being used for each element. Time required to discharge condensers is indicated on time clocks with a single sweephand, which are calibrated in percentage. Clocks are calibrated from previously prepared curves established by running known standards. Percentage of each element is then read from the corresponding clock and transmitted by means of a telautograph to the melting department, after which the clocks are zeroed by a reset button and the instrument is ready for additional samples.

The spectrometer is calibrated for the following elements and ranges:

Elements	Range
Manganese	.10-1.80
Silicon	.01-1.50
Chromium	.01-7.00
Nickel	.01-5.00
Molybdenum	.01-1.00
Copper	.01- .50

Calibrations are being made for vanadium and tungsten. A petrey type stand has been furnished for point to plane sparking when this type of analysis is necessary. With the aid of a switch, the instrument may be made instantly ready for 2000 volt alternating current arc analysis. In this case, additional phototubes are necessary and dual scales are used on the clocks when calibrated for more than one element.

The direct-reading spectrometer is installed in a new air-conditioned laboratory, insulated with light diffusing glass brick. The walls and ceiling are of acoustic tile which has greatly decreased the noise from the alternating current spark circuit. Fluorescent lights and air-conditioning ducts are recessed and flush with the ceiling.

The spectrometer is rigidly constructed and not easily shifted to different wave lengths; therefore, the greatest benefits will be derived from use in control laboratory where rapid analysis is of more value.

Unusual Gantry Crane Mounted on Flatcars

Erection of a 12-foot diameter, 426 foot long oil-fired rotary kiln is taking place at the Tampa, Fla., plant of General Portland Cement Co., with the assistance of an unusual gantry crane, designed and fabricated by Austin Co., Cleveland, who is erecting the facilities. The gantry structure, mounted on two standard 50-foot railroad flat cars, operates on standard gage railroad track over carefully compacted soil.

Also on the cars are the standard 5-ton hoisting engines used in raising sections of the kiln into position. Lifts required in erecting the nine kiln sections ranged from 32 to 89 tons. These were placed at elevations up to 52 feet above the track level with a minimum of difficulty and lost time, the company stated.

Mounting of Hole Punching Units Facilitated

Mounting of Wales hole punching and notching units in press brakes is facilitated by a new method using "strip" templates, a development of Wales-Strippit Corp., North Tonawanda, N. Y. Faster setups, reduced press "down time" and easier storage of patterns are provided by this new method, designed for mounting of type BL and CJ hole punching units and type N notching units. The strip template fits into a Wales press brake rail for strip templates and is equipped with a T-slot.

Rail remains in the press brake when setups are changed. Strip templates are lifted out of the rail. Dowel or pilot holes are drilled and reamed in strip templates at center of locations of holes to be punched, these holes being for the pilot pins in Wales units. Pilot pins are located in bottom of units on center line of punches and dies incorporated in self-contained units. Setups are made outside the press, placed in the press brake rail and then bolted to the T-slot. After a pattern has been run, the same group of hole punching and notching units may be reused in other setups.

USE OF DIE CASTINGS

Grows with Development of Better Production Equipment

ONE of the most significant trends in die casting is the growth of the industry in recent years. The 1946 figure of 280,000 tons of die castings shipped represents one-quarter of the entire nonferrous casting output of the year on the basis of weight alone. This fact is brought out by Fred C. Ziesenheim, sales manager, plastics and die casting machinery, Hydraulic Press Mfg. Co., Mt. Gilead, O., who estimates that there are about twice as many machines and three times as many firms engaged in this type of work as in the period preceding the war.

Postwar designers have found new applications for the process, both in the fabrication of "appearance" parts and in functional mechanisms. He states that present demand for parts is approximately 60 per cent zinc and 40 per cent aluminum, the former being used extensively for automotive and similar commercial applications as it may be readily chromium plated.

Modern machine design has made considerable progress in eliminating porosity from die castings, giving them increased strength. Shrinkage voids and entrapped air and gases are the two sources of porosity in castings. Application of pressure on the casting as it chills in the die is being used to overcome shrinkage voids, he states. Pressure also tends to minimize the effect of entrapped air and gases. It therefore is essential that modern machines be capable of applying and holding high pressure within the die cavities.

Lighter Castings Being Made

Trend toward larger zinc die castings noted before the war has been reversed. An example of the large castings used in that period was the 29-pound radiator grille of the Cadillac. Lighter castings are being made which are assembled into larger appearing units, as for instance, the radiator grille assembly of the Oldsmobile which consists of five die cast bars, each of which is easier to cast, polish and plate. A further advantage is that the whole assembly will not have to be thrown out for a single defect.

One of the largest aluminum die castings made to date is the Jack & Heintz air cooled engine cylinder and crank case unit. The air cooling fins are thin, long and spaced fairly closely together. The casting weighs 15 pounds as cast and 13 pounds finished. The dies weigh 14 tons and took 50 men 1 year to build.

Die cast air cooled engine blocks for aircraft and automotive use are entirely feasible and practical, he pointed out. McCulloch Motors Corp. of Los Angeles recently announced a 3-cylinder, 2-cycle opposed piston air cooled engine of 125 horsepower, weighing 150 pounds. It consists of five major aluminum die castings and six aluminum pistons and other elements. Other uses for magnesnum and aluminum die castings are, according to Mr. Ziesenheim, large automobile body panels and doors and master and service cylinders of hydraulic brake systems. Castings of the latter type reportedly have been used in the aircraft field for years.

Other parts using die castings include fluid drive couplings for automotive use having aerofoil blade sections (which will reduce slippage from 10 to 2 per cent) which are die cast. Car heater fans, produced by the same process, are said to be more efficient.

Integral Die Casting Aluminum

Electric motor manufacturers are turning to die casting for housings, end bells, etc., as well as for help in improving actual working parts. Rotors, rotor bars, separate conductor rings and fan blades are now cast integrally of high purity aluminum. The integral die cast aluminum rotor provides a light, long-life assembly with no sub-elements to come loose and cause trouble. Westinghouse was one of the first to use high purity aluminum on production line motors.

Advantage of die casting is not only a higher output per man hour but a much lower reject ratio; this is due again to the application of high final injection pressure in the casting cycle. Westinghouse, for example, has a two-cavity die which makes rotors of 3½-inches outside diameter by 3 inches thick at 60 shots of the pairs per hour, per machine. Rejects reportedly are between 1 and 1½ per cent.

Because of the low rejection factor, large rotors are being considered for die casting by many manufacturers. The building industry is using more zinc die cast hardware to meet shortages and cut costs. Meters, gas and electric, and even electrical conduits are now made more economically of aluminum die castings.

Methods and equipment used for brass die casting can be the same as for the cold chamber die casting of aluminum. However, due to the metal temperature of 1800° F for aluminum, it is obvious that die life will be considerably less. Die life may range from less than 10,000 shots to as many as 100.000 shots. The most successful brass die castings have been those involving thin-walled sections although some quite large brass die castings, up to 12 to 15 pounds, have been made successfully.

An important need for the efficient cold chamber die casting of large heavy castings is a method for automatically ladling the molten material into the cold chamber injection system. A proposed method under development by Ajax Engineering Co. of Trenton, N. J., is the discharge at uniform rate for a given period of time of hot metal from an electric induction furnace, by utilizing the "pinch pressure" or magnetic flow movement of the hot metal through an orifice or tube about the electric transformer. It is now being adapted to permanent mold practice where the molds can be transported past the furnace. The problem of transporting hot aluminum from the furnace to the cold chamber without the metal "freezing" or picking up iron, is a difficult one.

Mr. Ziesenheim expects to see expansion of diecasting in the future, just as it has increased at a significant rate in the last few years. Reasons for growth include better production equipment, and increased use of die cast parts by designers. He expects to see larger die castings, particularly in aluminum and magnesium, and expansion in the use of brass. Developments in die casting equipment will lie in the direction of a more versatile range of machine sizes and in improved methods of introducing molten metal into cold chamber machines.

Sealing Tape Withstands Adverse Conditions

An aircraft sealing tape, versatile in that it is not affected by gasoline, oil or water and may be used where required baking temperatures run as high as 375° F, is now being made in three thicknesses. Made by Pittsburgh Plate Glass Co., Pittsburgh, to bear the name Nu-Chromseal, it is adhesive on both sides, clean to handle and rates high in dielectric values, the company states.

Its consistency reportedly allows for easy tailoring around radical contours. Excess material may be readily trimmed with the finger nail or a blunt instrument. Other stated uses are for automobile weatherproofing, boat and container sealing, gaskets, glazing and insulation purposes.

INDUCTION HEATING

Steps Up Desoldering Operations

PRODUCTION increases of over 500 per cent are reported by East Ohio Gas Co., Cleveland, since installing an induction heating unit for the desolderng of gas meters. Recently undertaking the maintenance of meters, the company formerly performed the desoldering operation with conventional soldering irons, but found that operation was too slow. Time required to remove the top and two sides of an average size meter was about 15 min.

Reduction in labor time and consequently in cost was derived from the installation of the induction heating unit, a 7½ kw 10,000 cps Tocco unit made by Ohio Crankshaft Co., Cleveland. Additional benefits are that cleaning operations after desoldering are eliminated and an improvement in working conditions as heat is localized within the work.

Heating unit is a high frequency motor-generator type machine and consists of two sections. The bottom or power unit contains a vertical type high frequency motor-generator, timers and meters. The top section or work unit, contains the high frequency transformer and mounts the inductor coils. Two section construction permits location of power unit in an out-of-the-way place while the work unit is placed where most convenient. Only the latter unit is shown in the photograph of the unit in operation.

Board Calculates Electric Motor Starting Windings

Calculating a dozen variations of starting windings for some special condition to make sure that the best possible arrangement has been achieved would ordinarily be an expensive and time consuming job, because while motor running conditions are well standardized starting requirements vary considerably. With a synchronous motor calculator, developed by engineers of Westinghouse Electric Corp., Pittsburgh, all that is necessary is to determine several sets of starting winding constants for the motor, insert each set in turn on the calculating board, and the torque, line current and field current of the proposed motor can be read on built-in meters for each instant, from starting to full synchronous speed.

Design of the starting winding for a pump motor will serve as an example of the utility of the calculator. When no power was delivered to the motor the pump drove the motor backwards at a speed equal to 1½ times its rated forward speed.

Then the motor was required to stop the reverse motion and accelerate the pump to full forward speed in a given time. Windings for such unusual conditions would have required over 40 hours for calculation, say Westinghouse engineers, but only 13 hours, or one-third the time, was necessary when the calculating board was used.

Less-Than-Carload Freight Handling Facilitated

Four hundred of 2100 new box cars being constructed at the Altoona, Pa., works of the Pennsylvania Railroad will be equipped with devices similar in principle to the barnyard gate and closet shelves These are designed to permit more efficient loading of less-than-carload freight and increasing protection against its damage enroute. An increase of 133 per cent in the average loading of merchandise freight is expected from use of the devices in the new cars, the railroad states.

Steel gages with upper and lower sections are fastened to the sides of the car approximately 6 feet apart. When closed they lock together to form bulkheads across the car from the floor to near the ceiling. Sectional steel and wood shelves are hinged to the top of each of the lower gates. The effect is that of dividing the car into small compartments.

One hundred of the new cars equipped with the loading devices will be 60 feet long or 20 feet longer than standard, enabling more than double average loading, it is reported. The other 300 will be 50 feet long, 10 feet longer than standard, and will also be capable of increased capacity.

When a new car is unloaded, the load securing devices may be swung to the side of the car and locked into position, permitting the car to be used for general service.

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The Carmet-insert die produces *20 times* more silicon steel blanks before grinding than the die it replaced. Figure the down-time saved, then figure where *you* can use such superior wear-resistance. We preform Carmet sintered carbides to almost any shape or size—supply them finish-ground, too, if you wish. ● Call us in on your problem parts—and don't forget Carmet Tools for best results on your cutting operations.

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W&D 775

LETTERS *to the Editors...*

We Hear From Norway

With great interest we are every week reading your magazine, which gives us a valuable knowledge of the American steel industry and its problems. As two directors from our firm are going to American this Autumn, we are interested in some special information about the steel tube industry.

In your July 21 issue, this year, you have a statistic on page 68, called "Finished Steel Shipments in May and Year to Date". In this list there are under the heading "Pipe and Tubes" mentioned the production of different kinds of tubes (butt, lap and electric weld, seamless, conduit, mechanical and pressure tubing.) For each kind you have given the number of companies for which the total shipment is given. We would be very thankful if we could get the names of all these companies. If possible we would like the same list of names for the firms making hot rolled strip.

A/S Sonnichsen, Rorvalseverket
Box 4210
Oslo, Norway

The list of tube and hot rolled strip manufacturers is much too long to be given here. However, a statistical supplement to STEEL which appeared in the December 17, 1945 issue, contains all of this information. It is now on its way to Norway.—ED.

Highway Safety

I was particularly interested in the item in the August 11 issue on your yellow page "As the Editor Views the News" which was entitled "Limits Use of Autos", this item giving a condensation of comments by Mr. George Romney, managing director of the Automobile Manufacturers Association.

According to this report, Mr. Romney states that designers and manufacturers of automobiles and automobile parts have a public responsibility not only in making the automobile itself a safer vehicle on the highway, but in helping to see to it that the highways themselves are adequate and most of all, that vehicle operators are properly trained and educated to make them safe drivers. In this connection, I feel sure Mr. Romney will be interested in a technical bulletin which we published recently, this being our bulletin No. 442.

The subject taken up in bulletin covers work done by the U. S. Bureau of Public Roads and work done by one or two far-sighted groups in the field of driver testing. It devotes comparatively little space to the technical details of instrumentation, but most of its space is in general consideration of requirements for the safe automobile driver, comparison of the situation on highways with the situation on the railroads and on maritime vessels, and finally a discussion of steps that should be taken to correct the present intolerable situation.

R. J. Kryter
Sales Manager
Esterline-Angus Co. Inc.
Indianapolis 6, Ind.

India Also Needs Steel

We are arranging to send our subscription to STEEL. The delay has been because of the formalities to be gone through in getting the dollar exchange.

We shall like to introduce ourselves to you as an association of the leading manufacturers of agricultural machinery, implements and utensils in Cawnpore in Northern India. For the manufacture of these articles we require huge quantities of iron and steel. Our government tries her best by allotting us the highest quota, but it is not enough to meet our full requirements due to the acute shortage here. But we feel it our duty to help the agriculturists in meeting their requirements for agricultural machinery so that they may be able to raise a good harvest as our country is facing a great food crisis. We, therefore, seek your help and co-operation in supplementing our requirements of iron and steel from your country.

We are aware that there is a steel shortage in your country also. But depending upon the generosity of your people and the government which is allocating quantities of grain to our country to fight the food shortage, we cherish a sanguine hope of getting iron and steel also from your country.

Secretary
AMIU Manufacturers Association
Cawnpore, India

The Editors hope that someone may be of assistance in supplying some of this organization's needs in spite of the very intense steel shortage in this country. AMIU states that they can use mild steel black sheets of any size and various gages, galvanized sheets of any size, round and square mild steel bars; railroad coils and leaf spring steel (railway rejected materials) and used files. Further details may be obtained from STEEL'S offices.—ED.

Duct Insulation Reduces Fuel Costs

Three general duct usages which require insulation are carrying of hot gases, carrying air for room heating and air conditioning and carrying cool gases. Proper duct insulation cuts fuel costs, prevents heat from radiating into or being absorbed from work areas and makes possible greater control over heating and cooling systems, according to the Industrial Mineral Wool Institute, New York.

Insulation of ducts used in ordinary room heating is valuable in preventing heat from being dissipated before reaching its destination. When cool air or gases are carried in insulated ducts, the additional annoyance of deteriorating condensation sweating is prevented, states the institute. Operating expense is a determining factor in every case. For inside installation where temperature gradient is not great, the institute gives the following procedure: Clean duct of all grease and dirt; cut mineral wool blocks to conform to area to be insulated; and wire blocks to the ducts, using galvanized or expanded metal angles to keep the blocks in line at the corners.

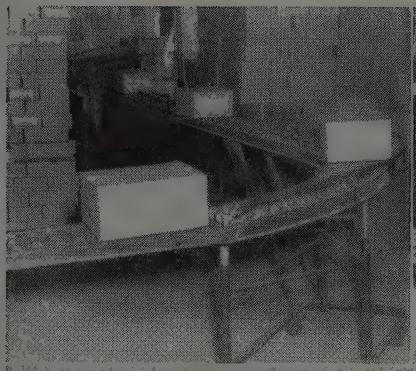
Proper Installation Procedure

Procedure for installations with greater temperature gradient is: Trowel a ½-inch coating of mineral wool insulating cement over surface of the blocks; follow this with a layer of 1-inch mesh poultry netting; apply a ¼-inch coating of finishing cement. In cases where duct contents are at a lower temperature than the surroundings, an asphalt or other type of vapor barrier must be applied to the insulation exterior, the institute recommends, this preventing atmospheric moisture from permeating the mineral wool and condensing therein, thereby spoiling its insulating qualities.

American Metal Markets

Metal Statistics—1947; cloth, 6 x 4 in., 816 pages; published by American Metal Market, 18 Cliff St., New York 7, for $2.00.

Consisting generally of production, consumption and price data for ferrous and nonferrous metals, the 40th edition of this reference work contains the same general statistical information as has been included in previous editions. In addition, certain information, not previously available, is included. Import and export data, for example, again issued by the Department of Commerce are published as are some statistics concerning world production and consumption of materials vital to the metal-working industries.



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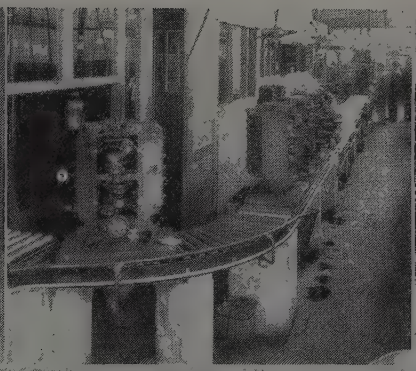
Let gravity work for you . . . Portable and easily adjusted, standard 5' and 10' sections of Rapid-Wheel Conveyor can be quickly coupled.



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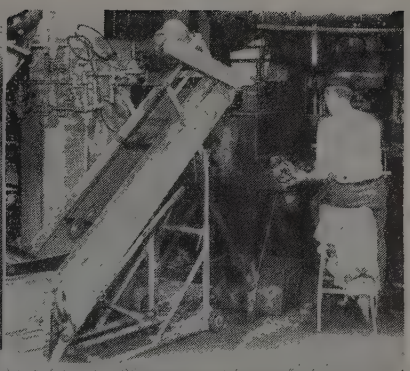
Moves anything with one firm free-running surface. Unique frame and roller construction combines greater sturdiness with minimum weight.



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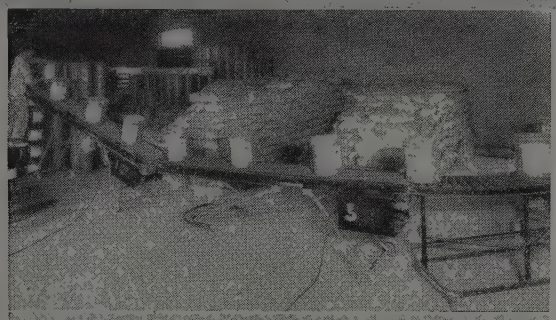
A portable, power driven endless cleated belt conveyor for varied uses. Compact in design for efficient operation at close quarters.



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A portable power belt conveyor for package and bag handling . . . for loading and low stacking operations. Maximum operating height 72".

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Heavy duty portable power belt conveyor for quick handling of cartons, boxes, or bags. Makes light work of stacking heavy loads.

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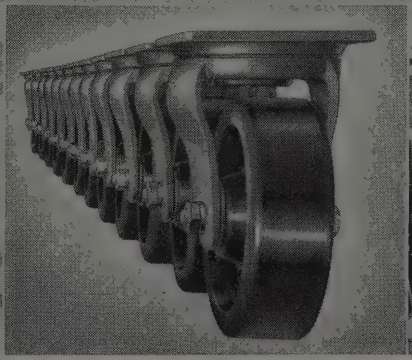


FLOOR TRUCKS

Heavy duty trucks that retain free-running action year after year . . . built in sizes to meet practically every requirement.

PLANT "WORK ZONES"

. . . heated efficiently by high-velocity discharges of warm air above heads of workers

SPACE heating—so often a problem in large, spacious factory-type buildings—is made both efficient and economical in the 6500 sq ft, 40 ft high roof fabricating plant of Minweld Steel Co., Pittsburgh.

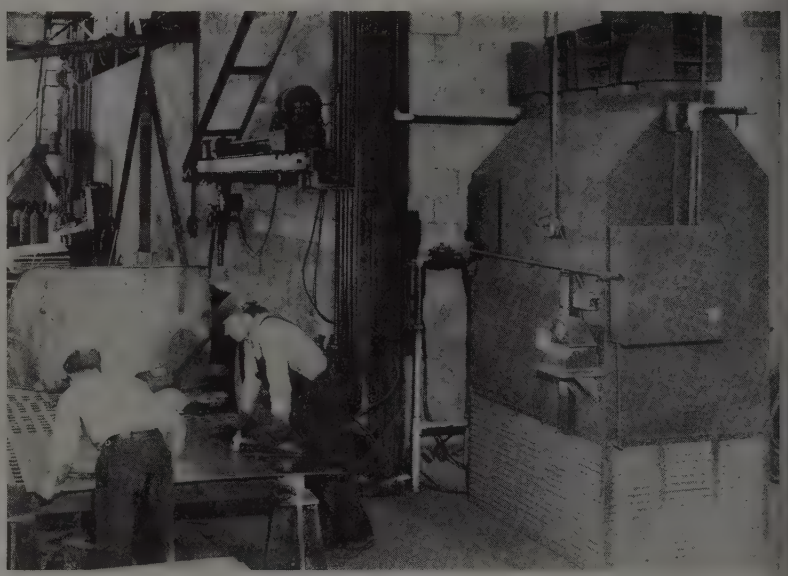
Using a system of space heating, developed by Dravo Corp., Pittsburgh—which operates on the principle of recirculation of warm air in the working zone—a comfortable working temperature is maintained while at the same time roof heat losses are minimized.

Heart of the system is a 750,000 Btu per hour gas-fired warm air heater, only one of which is needed to heat the plant to a temperature of between 60 and 65°F. Called a direct fired Counterflo heater, the unit shown in the accompanying view, draws cool air from all directions at the floor level, passes it over a stainless steel combustion chamber, then discharges the warm air at high velocity above the heads of the workers through four swivel nozzles. Because the air is drawn into the unit from all directions, no floor draft exists.

Plant walls are composed of protected metal siding, but the large number of windows for illumination and 19 ft truck doors at each end of the plant tend to make the heating problem more difficult. Discharge of warm air at high velocity makes a duct system unnecessary as the effective heating radius is said to be 150 ft. With plant floor space always at a premium, the comparatively small size of the heating unit is found to be an added advantage.

Minweld estimated that 20 manhours had been saved in a 2-week period as the company's 35 employees did not have to stop work to get warm around a central stove or heater. In addition, no maintenance is required for the gas-fired heater.

Despite the high temperature developed in the combustion chamber of the heater, the outer jacket remains cool enough to permit mounting of the time clock and time card rack on the jacket. Complete combustion of the fuel due to long flame travel within the heater is said to result in low fuel costs and low vent stack temperatures.



Inert Arc Welding Makes Stainless Strip Into Belt

Stainless type steel 302, in a 200-foot strip 36 inches wide and 0.30-inch thick, was welded into an endless belt in an Eastern chemical plant, using the inert-arc welding process with the thin sheets slightly overlapped at the start of the weld. Developed by General Electric welding engineers, the method reportedly reduced distortion and provided adequate reinforcement without adding filler material.

An air-cooled manual inert-arc electrode holder clamped to a crawler type travel carriage which traversed the joint at a uniform rate of 6 inches per minute welded the belt. A tungsten electrode, 1/16-inch in diameter was used with 47 amperes of direct current, straight polarity. Argon welding gas at the rate of 5 liters per minute shielded the arc.

Procedure was derived from trial welds on sample joints. One end was cut square across and clamped moderately firmly in the fixture projecting half way across the groove in the backing bar. The other end was first cut square, then draw-filed to form a shallow arc of about 1/32-inch at the center. This end was clamped, a little less firmly than the square cut end, so that it overlapped the other end 1/16-inch at the start of the seam and just barely overlapped it at the finish.

Bead, as welded, was 1/8-inch in width, very smooth and about 1½ times the material thickness. Majority of the reinforcement was on the under side. It was homogeneous and free of cracks. Bead was ground flush on the back and ground and polished to the vanishing point on the mirror finished working side of the belt.

Carbon Steel Wire Manual Available from AISI

Section 16 of the Steel Products Manual published by American Iron and Steel Institute, New York, has as its subject carbon steel wire. The 130-page manual is divided into four sections and has an alphabetical index and tables, drawings and graphs. The four sections are: General definitions and manufacturing practices; standard steels including limits and ranges for nonstandard steels; the evaluation of wire; and a glossary.

Automatic Aligning and Locking Toolholder Patented

Adapted to be connected to the dead spindle of a lathe or similar machine, a recently patented toolholder is reported to be of automatic aligning and locking construction. It is constructed so that when a tool held thereby is brought into engagement with a revolving work piece held by a live spindle, it is automatically shifted and brought into alignment with the live spindle and locked in that position.

Owned by Thomas R. Jones of Chicago and bearing patent number 2,399,-808, the tool may be easily inserted into or removed from the holder, it is said. The hold is reported to be compact and of simplified construction, being composed of only four separate members, which include a clutching ring and a coupling member.

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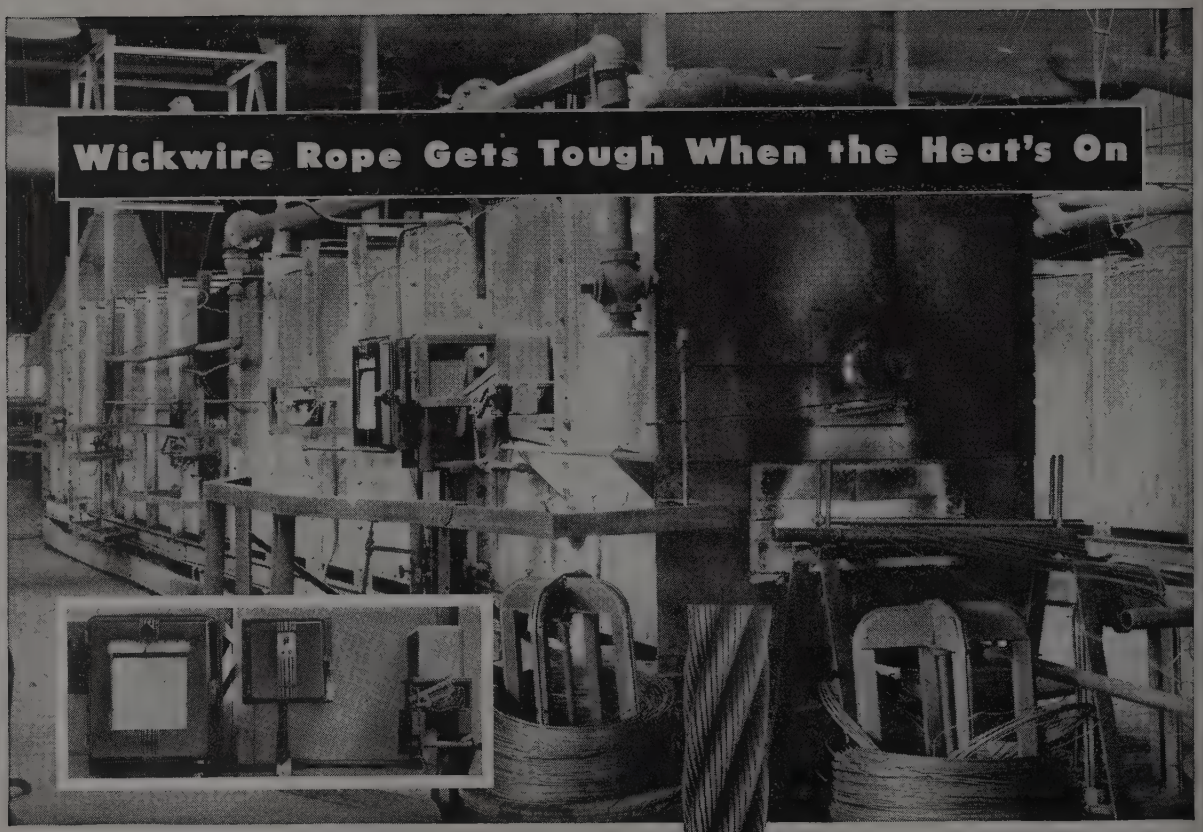

Traveling through a fiery patenting furnace changes the microstructure of high carbon steel—removes the effect of cold drawing, permits further processing and makes rope wire exceedingly strong and tough.

Temperature and rate of cooling have an important bearing on the size of grains developed in patenting, and grain size determines to a large degree, the physical properties of the wire. That's why the patenting furnaces at Wickwire's newly enlarged Rope Mill have controls so accurate that, even when operating at 1700°F., they anticipate a 5° drop or rise in temperature and automatically regulate the burners.

Accurate patenting temperature is one of many quality controls used in making Wickwire Rope. Because it contributes to rope strength and toughness, it is as important to you as the service of Wickwire distributors and rope engineers who are always ready to help solve your wire rope problems and to supply the right rope for your needs.

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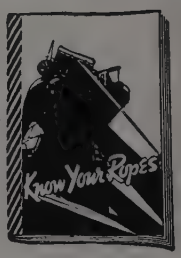

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Gas Combustion Equipment

(*Continued from Page* 79)

System No. 2: A natural development from the system described above is the use of burners which in themselves include the gas and air opening combined with a miniature combustion chamber or tunnel. The gas and air mixture is completed in the tunnel and gas combustion takes place, mostly in the tunnel. As the gas and air must be under sufficient pressure to travel into the combustion tunnel, suitable valves or automatic devices can be used to keep the mixture at the right air/gas ratio.

Either the air or the gas, or both, may be preheated, and relatively high pressures can be used. Burners may be individually adjusted or operated in groups. As no mixture is present except in the combustion tunnel, back-fire is impossible, and a wide range of operation can be achieved. This system is used in many common applications, such as steel heating furnaces of all types, and particularly large forge furnaces requiring luminous flame.

System No. 3: This is based on using a flame retaining burner nozzle supplied by some type of mixer, preferably one that will maintain close air/gas ratio control over a wide range of operation. The air/gas mixture may be exactly that required for complete combustion, or it may be something less. In the latter case, secondary air must be available around each nozzle to be sure to complete combustion. This system is probably the commonest combustion system in use, and the one most greatly abused. Examples are: Blast tip burners, torch burners, atmospheric burners, and flame retaining burners applied to almost every conceivable type of furnace or appliance using gas. Some of the modifications include high and low pressure gas entraining devices which draw in all or part of necessary combustion air, arrangements using draft to entrain both gas and air, and various other combinations.

System No. 4: Generally speaking, all of the systems so far described, except No. 2, are suitable only for combustion in the open or in furnaces under draft, or at best, with very low pressures. However, it is found that to develop high temperatures in small spaces, high combustion chamber pressures must be used. Furnace pressures of several inches are now fairly common. Also, many processes call for close control of combustion chamber gas analysis. This is particularly true in atmosphere generators.

In an attempt to meet these needs, the fourth system was developed. It consists essentially of some type of mixing device where both gas and air are under pressure and the streams merely join in the mixer. Each stream is separately controlled and the air/gas ratio must be maintained by continuous adjustment of the two streams. The mixture may be burned in any type of burner, but usually in an enclosed refractory combustion tunnel or tuyere. When the burner is "buried" or fully enclosed a very high combustion chamber pressure can be built up if the gas and air are also at high pressures.

System No. 5: This system, a refinement of No. 4, consists of burners which are supplied an accurate constant-ratio mixture at high pressure by some type of automatic mixing device. It meets the requirement of a wide range of applications, including many large and small heat treating furnaces, kilns, atmosphere generators, etc. Sometimes burner and mixing devices are combined. At other times one mixer supplies a number of burners, but in all cases the critical relations between mixers and burners cannot be greatly changed, which means each burner-mixer set must generally be operated as a unit.

Last named characteristic means that if it is desired to turn burners off and on independently, each must be a complete mixing unit. This means a lot of adjusting, it being a practical impossibility to get all burners adjusted to exactly the same air/gas ratio.

System No. 6: The sixth system eliminates this difficulty by using a single mixing source in the form of some type of compressor which draws in gas and air in measued volumes and delivers a constant ratio mixture at considerable pressure. Properly designed mixers of this type maintain ratio practically regardless of output, thus permitting individual burner operation as to quantity without affecting any other burners.

Because of the intimacy of mixture achieved in these machines, even at minimum output conditions, the mixture is always ready to burn. If considerable piping is required from the machine to various burners of large capacity, it is essential that this volume never become ignited or a serious explosion may occur. To guard against this serious danger, various back-fire or flash-back preventers or retarders have been developed. These are placed at each burner or at each take-off pipe from the main mixture line, or at both.

Requirement for safety as well as complexities of the mixing machine, make the equipment cost for this system relatively high, but the disadvantages are at least partially offset by two advantages. These are the possibility of independent burner operation and the fact that closely held air/gas ratio mixtures can be delivered to burners at high pressures. This permits wide distribution of uniform mixtures and high heat releases in small spaces. Multiple small spot heating is also practicable.

Gas combustion system comparator chart, Fig. 2, was developed for use in comparing various combustion systems

DEFINITIONS

1. Broadest definition of combustion might be—"the union of oxygen with any other substance at any rate." For this talk we will use the more common definition which is—"the union of oxygen with a gaseous substance at a fast enough rate to produce measurable heat or light, or both, continuously."

2. Ignition temperature is minimum temperature at which combustion will begin or continue.

3. Theoretical flame temperature is maximum temperature that would be produced by combustion of an ideal mixture, if no loss of heat from the flame took place.

4. Air/gas ratio is the volumetric or weight ratio of air to combustible gas. We will use the volumetric basis in cubic feet, both measured at standard conditions.

5. Burner—Any type of nozzle or nozzles in which the action of combustion starts or takes place, in part or in whole.

6. Mixer—A device for combining, in controllable proportions, air and gas streams for supplying a mixture to burners.

7. Mixing Machine—A device for mixing and for compressing a controllable mixture for delivery to burners.

8. Combustion Chamber—Any type of semi—or fully enclosed chamber in which combustion is carried on to any rate of completion.

9. Injector (also called Hijector, Lojector, inspirator, aspirator, inductor, eductor, Venturi Mixer, etc.) A device using kinetic energy of a stream of gas or air to entrain additional gas or air and to deliver the mixture at some pressure to burners.

10. Manifold—Pipe or system of pipes carrying mixtures to one or more burners.

11. Orifice, adjustable or fixed — An opening, usually round, through which air, gas or mixtures are fed from chambers or pipes at high pressures into chambers, burners, mixers, or injectors at lower pressures.

12. Static Gage Pressure—The pressure, either positive or negative, exerted in all directions by a gas or air stationary in an enclosure.

13. Velocity Gage Pressure—The pressure created by a moving stream of gas or air measurable only in the direction of movement. Always positive.

14. Total Gage Pressure—The algebraic total of static and velocity pressure at any point in a closed system.

15. Pressure Losses—Losses in static or velocity pressure in a piping system because of eddies, friction, bends, leaks, work done, etc.

16. Coefficient of Discharge—The actual discharge through an orifice as compared to the maximum theoretical discharge expressed as a percentage.

$$\frac{\text{Actual discharge}}{\text{Theoretical discharge}} = \text{Coeff. of Discharge}$$

17. Combustion System—A combination of mixer, manifold, burners, and possibly a combustion chamber, to produce a given quantity of heat to fit particular requirements of temperature, heating rate, space and process.

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and their combustion characteristics, as a preliminary step in determining their value in a given application.

In studying various systems, it is found that in going from one system to the next some characteristics increase from minimum to maximum; others decrease simultaneously from maximum to minimum. Increasing factors are:

1. Intimacy of gas/air mixing prior to ignition.
2. Permissible pressure at burners.
3. Speed of combustion completion.
4. Temperature achieved in combustion.
5. Noise of combustion.
6. Cost of combustion equipment.
7. Danger of destructive backfires.
8. Heat liberation per cubic feet of combustion space.
9. Ease of duplication of results.

Decreasing factors are:

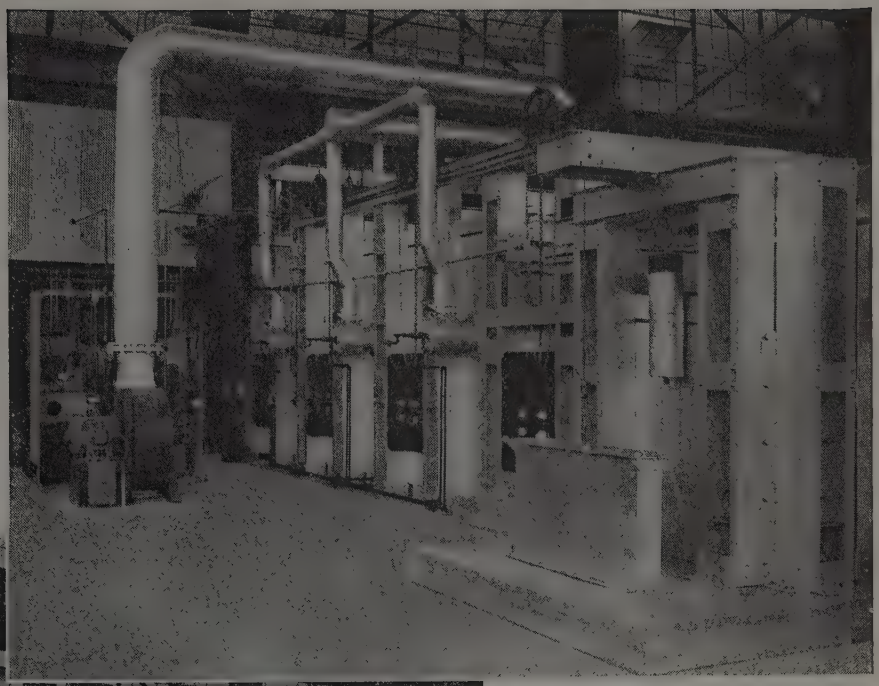
10. Color of flame.
11. Length of flame.
12. Time to complete combustion (opposite of 3).
13. Rate of radiation from flame itself.
14. Space required to complete combustion.

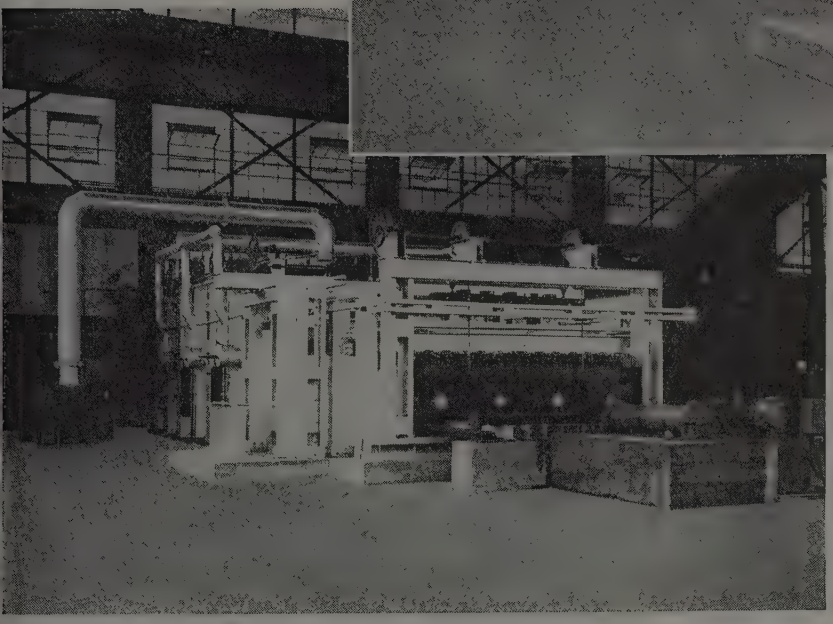
It is noted that the increasing factors are not necessarily desirable at maximum in every case, nor are the decreasing factors inherently undesirable at minimum. The desirability of any factor at maximum or minimum depends on the particular application and the specification to be met. It should also be noted that no one of these systems can claim inherently better efficiency than the rest, as no single definition of efficiency can be applied to all of them. It is very much like trying to rate people or clothes or nations. No single rating will apply to all of them.

Equipment: The more information you have on the various pieces of equipment available that go to make up the six basic systems, the easier it will be to make suitable modifications and thus solve your combustion problem exactly. This leads to cataloging the various kinds of mixers and burners. First, considering separate mixers, the various types are:

1. Some sort of Y or T mixer using gas and air, both under reasonably equal pressures, separately controlled.
2. Mixers using gas at some pressure above atmosphere to entrain air from the atmosphere, which are usually classified according to pressures used:
   (a) Mixers using low pressure gas (up to about ½-pound) normally entraining only portion of total air required for combustion.
   (b) Mixers using high pressure gas (up to 50 pounds) normally en-

Capacity 8 to 10 tons per hour depending upon slab or ingot sizes—and on the steel analysis





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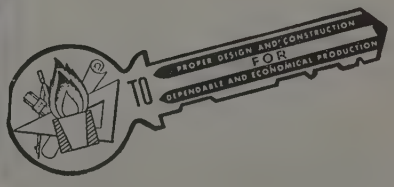

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training all or nearly all required air.

3. Mixers using air at pressure from 2 to 50 ounces entraining gas previously reduced to atmospheric pressure.
4. Mixers consisting of a fan or compressor drawing in correct proportions of gas and air, both first reduced to equal pressures. After thorough mixing in the machine, the mixture is delivered at considerable pressure to the burners.
5. Mixers using high pressure air (50 to 150 pounds) to entrain additional atmospheric air and gas to produce combustible mixtures at considerable pressure.

General Burner Classifications:

1. Simple multiple port burners, such as ring burners, pipe burners, ribbon burners, etc., where atmospheric mixtures are used. Size and depth of ports and their spacing is important to prevent lifting, flashback, over heating, and to give best performance.
2. Multiport blast burners. These carry large numbers of very small deep ports to reduce velocity, to keep each other lighted and to prevent back fire. In general a gas/air mixture will not burn into a port less than No. 55 drill size, particularly if the port is at least ten times as long as its diameter.
3. Single hole nozzles, to give high capacity, usually self-piloting to prevent blowing off of flame and usually utilizing some secondary air for cooling and completion of combustion.
4. Refractory tunnel or cup burners of all shapes which utilize flame impingement on refractory to assist combustion and to shield flame from infiltration of cold air or noncombustible gas until combustion process is complete. Usually utilize complete gas/air mixtures not requiring additional air to complete combustion.

Any of the five types of gas/air mixers may be combined with any of the four types of burners, either in one unit or as an assembly by means of piping, but the resulting combination can usually be placed in some one of the six fundamental combustion classifications discussed earlier.

Application Formulas: In designing and using these various burners, mixers, and combustion systems certain formulas and tables are very helpful. Among these are:

1. Formulas covering flow of gas through an orifice.
2. Formula covering mixture pressure developed by an entraining system.
3. Data on gas and air flow through pipes.
4. Rates of flame propagation.

Low Pressure Gas Flow Through Orifice:

1a — Formula for quantity of gas flowing through an orifice burner which is most commonly used is:

$$Q = 1658.5 \times K \times A \times \sqrt{P1 - P2/D}$$

Where Q = Quantity of gas measured in cubic feet per hour at standard conditions.

A = Area of orifice in square inches.

P1 = Gas pressure on high pressure side of orifice measured in inches of water column against atmospheric pressure.

P2 = Gas pressure on low pressure side of orifice measured in inches of water column against atmospheric pressure. Where the stream is discharging into the atmosphere, P2 becomes O.

D = Specific gravity of gas as compared to air at standard conditions.

K is the coefficient of discharge and is a variable factor depending mainly on the shape of the orifice and its flow characteristics. It varies from as low as 0.3 to as high as 1.5. For a given orifice it can only be determined experimentally with any degree of exactness, although experience will permit fairly close approximation by examination.

The above formula is strictly accurate only at very low pressures where the effect of compression causing the specific gravity of the gas to change is slight. However, for combustion work the error even up to several pounds is not serious.

High Pressure Gas Flow Through Orifice

1b. For pressures above 15 pounds the following formula evolved from one suggested by S. A. Moss may be useful.

$$Q = \frac{1104.3\ AK\ (P+14.7)}{d \sqrt{T}}$$

Where Q, K, A and d are same as for formula 1a, and P = Pressure drop through orifice in pounds per square inch.

T = Temperature at high side of orifice in degrees absolute Fahrenheit.

Using above flow formulas and having once established the coefficient of discharge of a given type of burner, orifice, throat, tube, or opening its capacity can easily be calculated for any pressures, or kinds of gases or mixtures to be dealt with.

Note that all holes, nozzles, orifices or burners having the same area will not necessarily have the same capacity. This erroneous idea causes a lot of trouble to amateur combustioneers in trying to match up capacities.

Mixture Pressure: It is frequently desirable to know how much mixture pressure can be developed by an injector or mixer when drawing in a given volume of air or gas. As we have never seen a formula which gave this figure, the writer developed one empirically which seems to check quite closely with experimental data. This formula is:

$$Pm = \frac{CE^2 \times d \times Pg}{(1 + R)\ (d + R)}$$

Where Pm = Mixture pressure (total) in inches of water column.

C = Coefficient of conversion of velocity pressure to static in mixer.

E = Coefficient of entrainment (dependent on design)

d = Sp. Gravity of entraining gas compared to air at standard condition.

Pg = Gage pressure of entraining gas at orifice in inches of water column.

R = Ratio of entrained gas to entraining gas.

On properly designed injectors and mixers "C" will be .85 or more. On our own Hijectors E^2 varies with R approximately as follows:

R	Used normally for.	E^2	CE^2 (C = .90)
4	Coke Oven	.82	.75
5	Water Gas	.73	.65
8	Mixed	.67	.60
10	Nat.	.55	.50
25	Propane	.50	.45

Example—Using .65 natural gas at 25 pounds, how much mixture pressure can be developed when entraining 10 parts of air for each part of gas?

$$Pm = \frac{F \times E^2 \times d \times Pg \times 27.7}{(1+R)\ (.d+R)}$$

$$Pm = \frac{.50 \times .6 \times 25 \times 27.7}{(1+10)\ (6+10)} = \frac{7.5 \times 27.7}{11 \times 10.6}$$

$$= 1.78'' \text{ W.C.}$$

Velocity Pressure: Formula for velocity developed by a given volume flowing in a given pipe when the flow is caused by a pressure drop "h" (inches of water) is: V (feet per min.) $= 4005 \sqrt{\frac{h}{d}}$. Converting this to cubic feet per hour flowing through a cross sectional area "A" (in square inches) the formula becomes:

$$Q = 1669 \times A \sqrt{h/d}$$

When used in this manner "h" is termed velocity pressure and when applied to flow in pipes should be kept very low, usually under 0.3" W.C. When it is realized that each time a bend is made by this flow practically all the velocity pressure is lost, the importance of this formula in sizing piping correctly becomes apparent.

Rates of Flame Propagation: Rate at which a mixture of gas and air will burn is affected by many things such as flame radiation, homogenity of mixture, turbulence of flow, over or under aeration,

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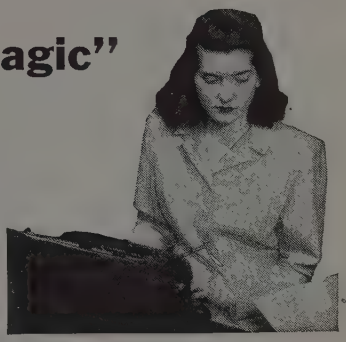

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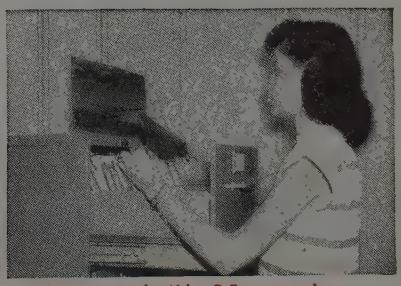

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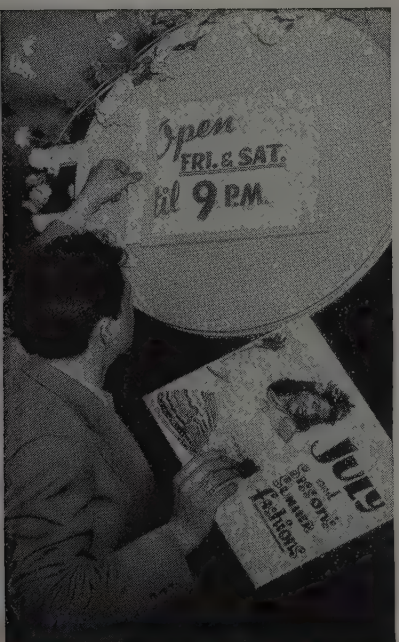

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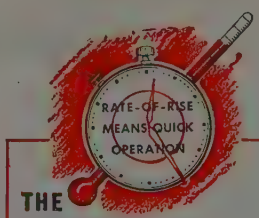

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effect of catlyst and many other factors.

However, it is very desirable to have some measure of speed of flame propagation to determine in advance the effect of changing from one gas to another. By testing a number of perfect mixtures of gas and air under identical conditions in combustion tubes a series of curves covering speed of flame travel have been developed which are very helpful in comparing different gases.

A study of these curves shows at once why coke oven gas burners backfire so easily, as compared to natural gas or LP gases. It also explains why many natural gas burners show a tendency to "blow away" from the nozzle or burner port.

In addition to a working knowledge of the six fundamental combustion systems, the five types of mixers, the four types of burners, and the formulas mentioned above, a good combustioneer should be familiar with the thermal properties of many materials, gases and liquids. This knowledge plus some common sense in applying it to his combustion problems will enable him to develop practical solutions that are economically sound.

System Warns of Overheated Bearings

Electrical resistance bulbs—sensitive to rises in temperature—are used in a new automatic, multipoint bearing temperature monitoring system. Adapted to both principal equipment and auxiliaries used in a wide variety of operations, the system, developed by the Instrument Division of Thomas A. Edison Inc., West Orange, N. J., is capable of monitoring as many as 24 bearings from each central control cabinet.

Each bulb is only 0.215-inch in diameter and is mounted in a small hole drilled in each bearing. Only the bulb tips are temperature sensitive and, because these tips are located in direct contact with the bearing metal very close to the inner bearing surfaces, existing bearing temperatures and their fluctuations are said to be sensed rapidly. The temperature of each bearing reportedly is checked automatically every 2 minutes.

If, when checked, the temperature of any bearing exceeds an established maximum (which may be different for each bearing), an alarm is sounded and identification made by an indicating lamp on the central control cabinet panel. Actual temperature is read by plugging an electrical thermometer into appropriate jack. A modification of the system not only sounds an alarm at one established temperature, but also automatically shuts down the machine if a second, and higher, established temperature is reached.

Sheet Metal Dies

(*Concluded from Page* 76)

all assemblies, where carbides are used, should be of rigid construction and be so designed as to remain rigid in service. Accurate alignment of nibs in case and of die in press is a "must," to insure maximum die life and product quality. Tendency is to use progressive rather than compound dies where more than one operation is to be performed with carbides.

On progressive dies it is not always necessary to use carbides for the entire die set. Frequently some stations or punches, for instance, produce an adequately long die life to permit retention of steel in those places, using carbides primarily where maximum wear occurs. Care should be taken, however, that design of all other parts aside from carbide nibs should be such as not to wear out before the carbide. Nibs should be husky enough, in progressive dies, to allow rigid attachment and have plenty of stock for regrinding, where extremely long runs are involved.

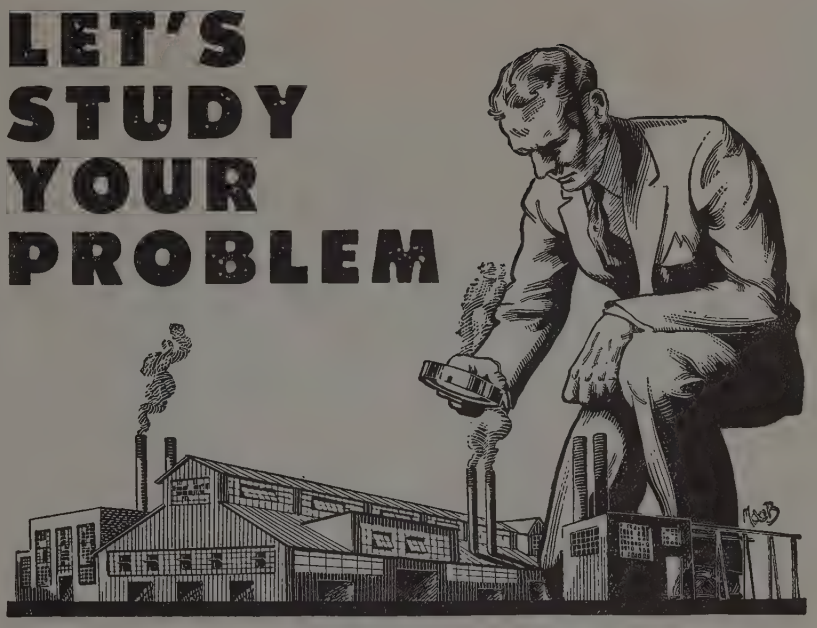
Punches: Use of carbide punches is developing rapidly. Following are some design considerations: Shearing edges should not be honed or touched up with a stone. Leave them sharp. They hold their edge when the correct grade of carbide is employed (55B is recommended because of its high inherent impact strength).

Carbide punches can be made with attached carbide sections or made of solid carbide. For smaller punches this is usually more economical. Mechanical attachment methods (as mentioned under blanking dies) are recommended for carbide punches, wherever possible. Where long slender solid carbide punches are used, it is good practice to guide the punch in a Carboloy bushing. Standard bushings are readily available.

Make carbide section of ample length to cover all points of wear. For light draw work, carbide punches may be assembled by brazing—usually by a tapered end fitting into a mating hole in the steel shank.

Listing of 874 Standards Available from ASA

An entire new listing of its 874 standards is available free of charge from the American Standards Association and may be obtained from their New York office at 70 East 45th Street. The new listing includes prices for complete sets, individual standards and quotes quantity discounts. A number of additional revised standards approved since the January, 1947 issue of all American standards are included.



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Hardenable Steels

(*Concluded from Page* 74)

latitude for changing travel speed.

On the other hand, if welding is being done in a comparatively narrow groove, there is little opportunity to vary the speed of arc progression. Thus there are practical considerations which restrict the welding engineer in his ability to change heat input values. For this reason, more attention is usually given to controlling the rate of cooling through some means of regulating heat extraction.

Turning to the right hand balance pan in Fig. 3, there are three primary factors affecting heat extraction. Everyone acquainted with the metallic arc welding process realizes that the mass of steel surrounding the weld pool extracts heat and solidifies the liquid weld metal. Greater masses of steel chill the weld metal and the heat affected zone more quickly. But there is a limit to the quenching effect. This limit has been established at a 3-inch radius from the point of arc.

That there should be a limit is understandable. If a red hot poker were cooled with a teaspoonful of water, it is very likely that color would remain in the poker. Now plunge the same red hot poker in a large tank of water and it cools to the same temperature as the water. Furthermore, if the poker were plunged into the ocean, assuming that the ocean and the large tank of water were at the same temperature, there would be no difference either in the rate of cooling or in the final temperature of the poker. That the same reasoning applies to the welding of steel is indeed a handy bit of information. Under identical welding conditions, the hardness of the heat affected zone of a 3-inch plate and that of a 6-inch plate would be precisely the same.

Applying this mass consideration to common joint designs yields the geometry factors listed in Fig. 6 where the shaded areas show the zones of effective cooling mass. The last pass of a butt weld or a single bead on a plate behave exactly the same way. Nor is the change due to less metal in a groove very great when C is compared with A. The added metal introduced by a back-up bar has a minor effect too. But the difference between a butt weld and a tee fillet is substantial.

With the following welding conditions: ¼-inch electrodes at 350 amperes and 33 volts, 1-inch plate, plate temperature of 400° F. and a welding speed of 6 inches per minute, the four joint designs in Fig. 6 lead to the hardnesses given in Table V when applied to A-4037 steel. As was predictable from the geometry factors, joints A, C and D have acceptable heat affected zones while joint B remains outside the pale of acceptable welding practice.

Joint design combines two mass problems: Type of joint and thickness of steel. Now establishing the following welding conditions: 5/16-inch electrode at 475 amperes and 36 volts, bead on plate, plate temperature 75° F and a welding speed of 6 inches per minute, the change in heat affected zone hardness as plate thickness becomes greater is as listed in Table VI.

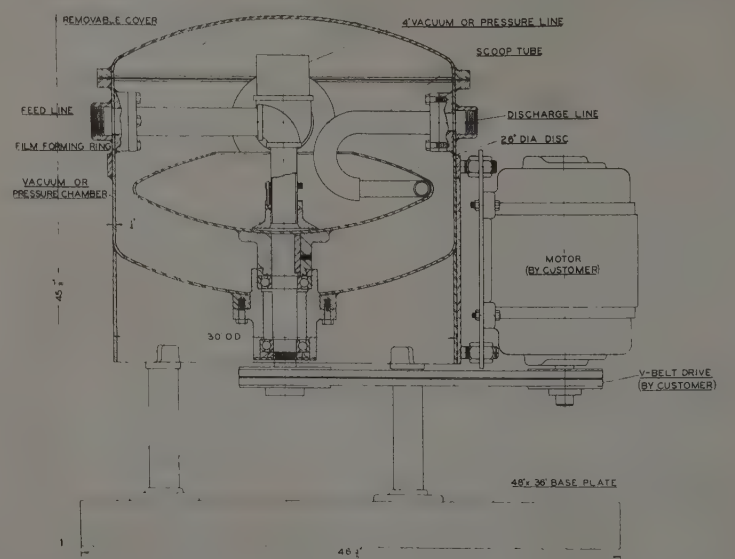
Finally, in this examination of heat extraction, plate temperature must be considered. Obviously, a hot plate will retard cooling in the heat affected zone thereby developing a softer structure. Theory and practice agree once again; Table VII clearly demonstrates the lower heat affected zone hardness achieved by preheating the plate. In this example the welding conditions are built around a 3/16-inch electrode at 225 amperes and 30 volts, bead on ½-inch plate and a welding speed of 6 inches per minute.

(*To be concluded next week*)

REFERENCES

1. *Guide to Weldability of Steels,* American Welding Society.

2. "Metallurgical Changes At Welded Joints and the Weldability of Steels," Robert H. Aborn, *Welding Journal,* Research Supplement, October, 1940.



MATERIAL REDUCER: Versatile processing tool diagramatically shown, reduces centrifugally any flowable material to a micro or mono particle film without application of mechanical pressure and without any temperature rise. Developed by Cornell Machine Co., New York, it can be used for emulsifying, homogenizing, dispersing solids in liquid vehicles, degassing or deaerating solutions; for dehydrating or distilling extremely heat-sensitive materials without thermal decompostion; for impregnation, diffusional processes or oxidations. Machine consists of a pressure chamber in which a disk in form of an open bowl operates at high speed. Material is fed onto center of revolving disk, centrifugal force flowing it out radially in ever widening spirals. Top speed of the unit is 1800 rpm

Color Used To Identify Fire Extinguisher Types

Selected to provide strong contrast for instant, positive identification, colors are being used to distinguish different types of fire extinguishers made by Pyrene Mfg. Co., Newark, N. J. All nameplates, ringcaps and handles are painted with the identifying colors; shipping cartons and recharge packages are also so identified.

Colors and the uses to which the extinguishers bearing them should be put are as follows: Bright blue, soda-acid and cartridge operated water type, for class A fires (wood, paper, textiles and other ordinary combustibles) in locations not subject to freezing; bright red, foam —all types of foam extinguishers and foam-making equipment, for class A and B (gasoline, oil, lacquer and other flammable liquids) fires; dark green, pump tanks and cartridge operated antifreeze extinguishers, for class A fires in locations subject to freezing; and reddish brown, vaporizing liquid, for class B and C (electrical equipment and wiring, calling for a nonconducting extinguishing agent) and small class A fires.

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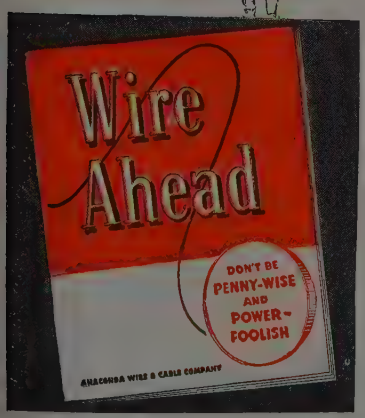

*WIRE AHEAD, a new booklet discussing preventive maintenance . . . the symptoms of inadequate wiring . . . and presenting plans for anticipating electrical demand, is now in preparation. We shall be glad to send it on request as soon as it is available. Address Advertising Department, 25 Broadway, New York 4, N. Y.

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Casting Steel Mill Rolls

(*Concluded from Page 82*)

Most iron rolls are "chilled" rolls, that is, they are cast in iron molds so the outer surface will cool faster and therefore have a harder surface. A revolving brush is used to clean the inside of each section of a chill mold of all dirt, rust, oil or grease. The surface is then sprayed with a special, expensive blackening compound to protect the chill mold when the hot metal is poured into it later. Since a hard surface is required only on the body of the roll while softer and stronger metal is desired in the necks and wobblers, these parts are cast in sand so they will cool more slowly.

A wooden pattern, the size and shape of the necks and wabblers, is placed inside that part of the steel flask and special sand is tamped tightly in the space around the pattern. The pattern is then removed, leaving the cavity into which the metal will be poured. After the sand surface has been blackened, the the entire mold is placed in an oven for several hours to bake out all the moisture.

In Fig. 6, mold for large plate mill roll is shown assembled and placed in pit ready for pouring. Runners through which the metal is poured, are on the outside of the mold in contrast to steel practice.

Fig. 7 shows metal being poured into the two runners at the same time. Ladles are tipped by men turning the wheels, while a third man using a shield to protect him from the heat of the white-hot metal, looks down inside the roll and watches the metal swirling up to the top, so he can regulate speed of pouring.

Iron is poured slowly at first until the level of the molten metal just covers the entering gates then it is poured as rapidly as possible. In order to be able to pour faster iron rolls are poured from the lip of the ladle rather than through a nozzle at the bottom. Iron is poured at a temperature about 300° lower than steel and therefore must be poured faster because it sets much more quickly in a chill mold. The roll being poured in Fig. 8 will be 28 inches in diameter, have a body length of 14 feet and weigh 16 tons. All rolls are not so large, however. Fig. 7 shows the pouring of a series of small rolls.

Electric Furnaces Increase Brazed Parts Production

One operator at each of two new 320 kilowatt roller hearth electric brazing furnaces installed in the North Chicago Division of Houdaille-Hershey Corp., easily handles the conversion of stamped, sheet steel plates into brazed sections, later to become refrigerator evaporators. These furnaces, along with three older models, were installed by General Electric Co., Schenectady, N. Y.

Brazing begins after the operator places a copper strip between two steel stampings, loads the material on a heat resisting alloy rack and pushes the rack over rollers toward an automatically controlled door on the charge end of the furnace. The door, 35 inches wide, opens vertically 13 inches, giving access to the 17-foot heating chamber which brazes the pieces together at 2050°F.

Rollers convey the brazed parts from the furnace chamber through a 70-foot cooling chamber. Discharge door of the chamber opens automatically to permit them to roll out to a specially designed conveying system that Houdaille-Hershey installed for use with these electric brazing furnaces.

Leaving the cooling chamber the racks are guided by rollers to an endless conveyor which in turn places them on rollers and another endless chain; they eventually end up at the charge end of the furnace where they are unloaded by the furnace operator. Parts are then carried on fork trucks to be baked, chemically treated, soldered and formed into the final evaporators.

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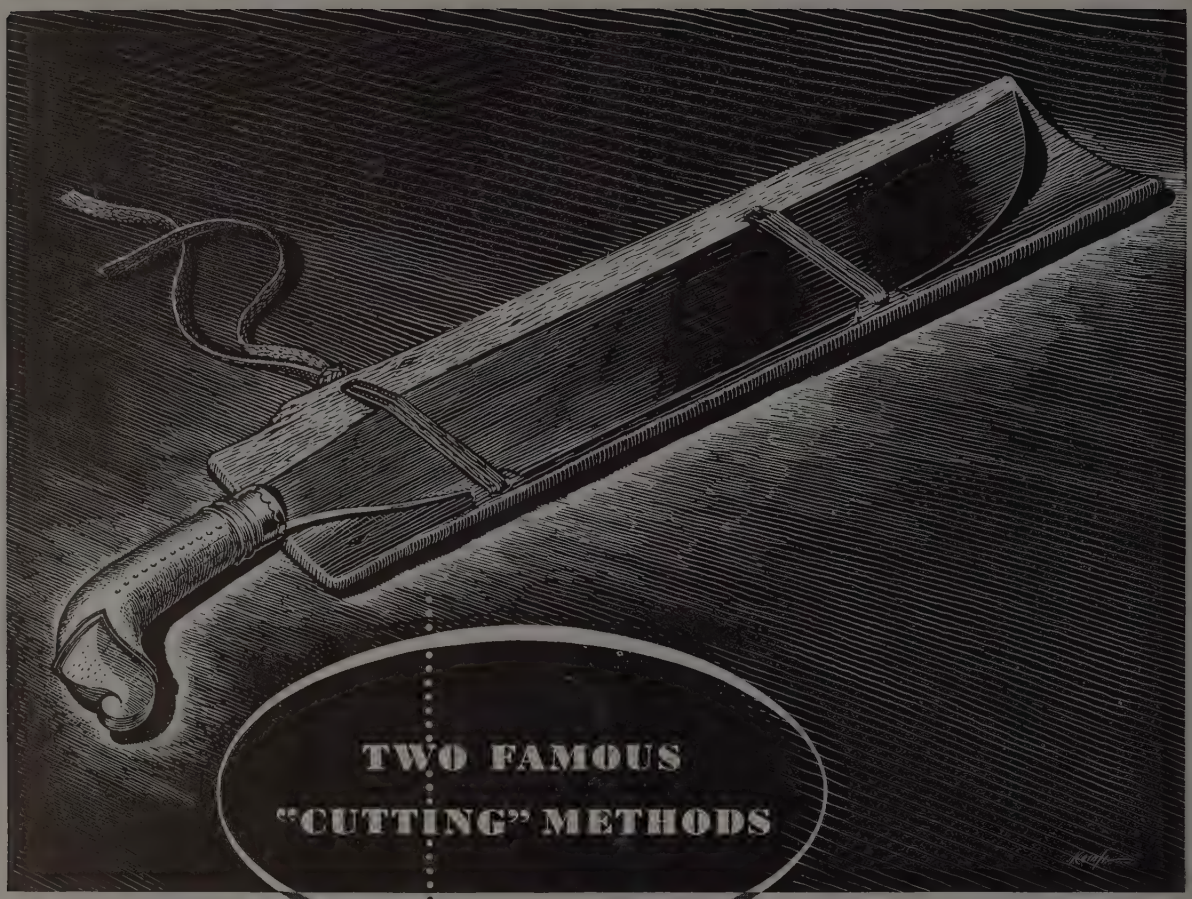

1. BOLO KNIFE

An all-purpose knife native to the Philippine Islands although it resembles the South American machete. It's a large single edged knife used for cutting brush, making shelters, huts, for hunting and self-protection.

2. ALEMITE

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New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 118

1. Fork-Lift Truck

Ability to operate at right angles in 8-ft aisles in warehouses, plants and factories where aisle space is at a premium is a feature of the electric Palletier fork-lift truck model LVGH-X, built by Crescent Truck Co., Lebanon, Pa. It will operate in aisles of this width with a

42 inch long and 32 inch wide pallet load. Capacity of the new model is 2000 pounds with a 34-inch load length and 1750 pounds with a 42-inch load length.

Full magnetic contactor control protects unit against forced acceleration, lengthening the life of the motor and tires. A hydraulic lift assures minimum maintenance. All control levers are at operator's fingertips. Inspection and maintenance is simplified by ready access to all mechanisms.

2. Mounted Point Kit

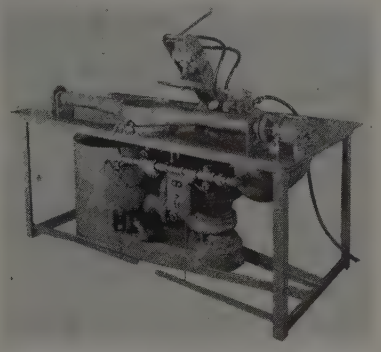
Made up of one each of the 16 most popular sizes and shapes, the No. 16 mounted point assortment for small grinding tools, made by Norton Co., Worcester, Mass., is packaged in a box which serves as a shipping container and a bench holder while points are in use. Each point has its own individual location in the box. All are of fast, cool cutting 38 Alundum abrasive vitrified bonded and cemented on steel spindles.

3. Air Valve

Knox Industries Inc., 5548 North Main St., Lexington, Mich., is manufacturing a 4-way air valve, know as the Air Miser, and designed with a by-pass port in the bronze disk which allows half of the compressed air used in the power stroke to be used to return the piston. Utilizing this air reduces the load and volume consumed from the air compressor by 50 per cent. Valve also has an auxiliary port which can be used should more air be needed to return the piston.

4. Vacuum Test Bench

Production line testing of castings for porosity by the vacuum process is possible with vacuum test bench, designed for the particular part to be tested, built by Whittington Pump & Engineering Co., 245 South Meridian St., Indianapolis 4, Ind. Castings are positioned on a flexible rubber pad on the bench top with one of the holes over an opening con-



nected to the vacuum volume chamber. Operator holds pads over the other openings, depresses the foot treadle permitting the vacuum to suck the pads tightly over the openings and watches the needle on the vacuum gage. If it holds its position, the casting is approved.

Stampings may be tested for invisible fracture. It may also be used for testing of such parts as cylinder heads, motor blocks, oil pistons, manifolds, etc. Photograph shows a rear axle housing on the test bench.

5. Conveyor Belting

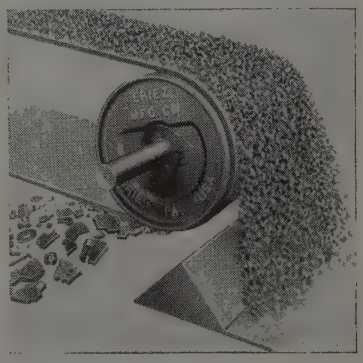
Flexible, flat-top stainless steel conveyor belting, made by Anderson-Barngrover Division of Food Machinery Corp., San Jose, Calif., is resistant to surface abrasion, has no-stretch characteristics and is easily cleaned. Joined by 12-gage stainless steel spindle wires, self locking on the underside to form a continuous length, the belting is available in either solid-top links or links with 1/4-in. perforations for drainage and ventilation. Ridges on underside add strength and provide a continuous lever surface for head and tail pulleys and support rollers. Belting may be supplied in any length and in widths in multiples of even inches. In addition, it is offered in electro-galvanized steel.

6. Lead Anode

Each inch of length has 15.5 sq in. of surface on the 71-point lead anode designed by Division Lead Co., 836 West Kinzie street, Chicago 22. Arrangement of points concentrates gassing to create a rapid flow of solution against the surface. Disintegration is uniform over the entire surface. Anode is extruded of antimonial lead, its deep-ribbed construction preventing warping and buckling. Bronze hook is hot lead dipped and burned directly to anode.

7. Magnetic Pulley

Eriez Mfg. Co., 2699 East 12th St., Erie, Pa., is manufacturing a self-energized magnetic pulley adaptable to all applications requiring automatic separation of magnetic from nonmag-



netic materials conveyed on a belt. It may be used for removing iron fins, particles and gaggers from foundry sand or for separating ferrous from nonferrous borings, turnings, etc.

Powered by Alnico magnets, the pulley is not affected by temperature changes and unusual operating conditions. It always operates at full efficiency.

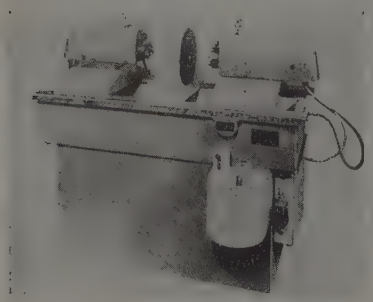
8. Bench Spotlight

Operating from 110 v ac through a transformer, the Opti-Spot made by Benton Co., 351 South LaBrea avenue, Los Angeles 36, has a light cell which contains a focusing condenser lens by which size of spot may be varied. Lamp is ordinary 6 v automotive type, sufficiently

strong to permit use at any distance up to 6 ft from the work. Available are two models, A with a 16-in. flexible tubing connection between lamp and base and model B with an 18 in. rubber covered cord between lamp and base.

9. Centering Automatic

Concentricity of shaft center holes is assured by revolving workpiece of the Benjamin centering automatic, made by Stanford-Roberts Mfg. Co., 619 East Iron Ave., Dover, O. Its chucking and machining cycle is fully automatic, permit-

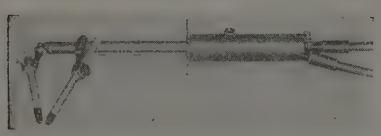


ting both ends to be drilled, faced, centered, turned and threaded simultaneously. It can also be used for boring and beveling tubing.

Fixtures may be attached to each end of center drive chuck to hold work other than shafts or tubing, so that machine can process two pieces at one time. Center drill point is self oiling and cleaned by forced air. Capacity of machine is 1/8 to 1 1/2-in. diameters, 5 to 30 in. lengths.

10. Arc Torch

Welding and brazing operations which require a very soft flame may be performed with the double carbon arc process, using the new arc torch announced by C. E. Phillips & Co., 2750 Poplar street, Detroit 8. Current conducting members of the torch are two concentric metal tubes, one sliding easily within



the other and insulated by a fiber sleeve, thus automatically maintaining alignment for all adjustments of arc gap width. A control button is located in the fiber handle.

Torch map may be used with all types of arc welding machines, alternating or direct current, and will accommodate carbon electrodes from 1/4 to 3/8-inch diameter without changing holders. When connected to the arc welder, a slight pressure on the control button closes the circuit; then by releasing pressure the arc is established, producing a soft, quiet, hot flame. It may be used in brazing thin sheet metal, including aluminum, many types of brazing and nonferrous metal welding, hard facing, preheating, spot hardening and spot annealing.

11. Fluid Power Package

Combined in the Seco fluid power package, made by Simplex Engineering Co., Zanesville, O., are the essential components for automatic high-low hydraulic press operation. It is necessary only to couple the high and low pressure circuits of the unit to the press. The transition from low to high pressure is automatic, and when the predetermined

high pressure is reached, it is held until released.

Unit is furnished with press control valve, pilot check valve at the press, magnetic starter with push button control for application to the press, forged high pressure fittings and tubing for the high pressure circuit. Heart of unit is a radial high pressure pump, designed for generating up to 10,000 pounds per square inch within its hollow pistons. Both high and low pressure pumps are gravity primed and both circuits are controlled by a single lever.

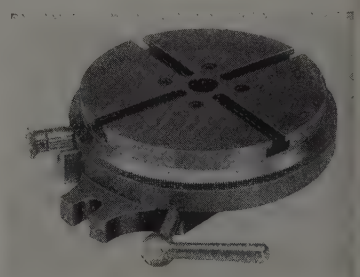
Five models of the power units are made, with maximum pressure and gallons per minute as follows: 3000 and 1.25; 6000 and 0.75; 2000 and 3.5; 3000 and 2.25; and 6000 and 1.25 (high pressure circuit). Low pressure circuit pressures and capacities for the same models are: 300 and 20; 350 and 20; 300 and 35; 300 and 35; and 350 and 35.

12. Faucet Insert

Available in two stem finishes, brass and chromium, the standard model faucet insert made by Superior Valve Mfg. Co., 3301 Mayflower road, Cleveland 15, will fit 95 per cent of faucets now in use. It provides a complete new faucet mechanism—tread seat, stem and a new type compression shut-off. Latter is concentrated in a floating bronze bearing which is forced up by "on" water pressure and then forced down as handle is turned "off".

13. Rotary Work Table

With a 5-inch diameter rotary work table, offered by H. P. Preis Engraving Machine Co., 157 Summit street, Newark 4, N. J., engraving, profiling, graduating, milling and drilling on circular name plates, dials, round dies, etc., may be carried out. The outer rim of the table

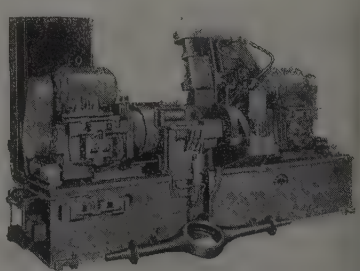


is marked in degrees and numbered at every tenth degree.

Each degree is notched for quick and accurate division by engaging the index unit, which may be disengaged for free turning. Top and bottom surfaces are ground parallel to assure an even depth of machining over the entire surface. Working surface is provided with four tee-slots for ¼-inch bolts and a ⅝-inch diameter hole for centering the work with a stud. Overall height is only 1¾-inches and weight is 9 pounds.

14. Drilling Machine

Drilling 21 holes in a single automatic cycle, a new special automatic drilling machine made by Synder Tool & Engineering Co., 3400 East Lafayette avenue, Detroit, operates in automatic sequence a movable bushing plate and two individually actuated hydraulic clamps for



locating and clamping the work piece in the fixture. The entire work cycle requires 15 sec.

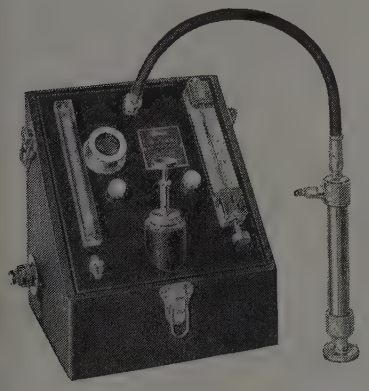
Hydraulic clamps are mechanically locked to hold parts securely in place while machining. Parts are engaged by two opposed pilot diameters which enter

the banjo face bores of the truck rear axle housings for which the machine was developed. Two self-contained hydraulic units, each carrying a 10-spindle head, are mounted opposite each other. A single spindle unit mounted on an inclined angle and behind one of the multiple spindle units, drills the breather hole.

High speed steel drills, operating at 60 sfpm feed 0.008-in. per revolution. Coolant equipment and hydraulic tank, pump and motor are enclosed in the welded steel base which is normalized and ribbed for strength and rigidity.

15. Dew Point Computer

Designed so that dew or fog is observed suspended in air, enabling two or more observers to get the same results, the Alnor Dewpointer, made by Illinois Testing Laboratories Inc., 420 North La



Salle street, Chicago 10, eliminates need for external coolants. Readings are taken in a matter of seconds after only a short period of practice.

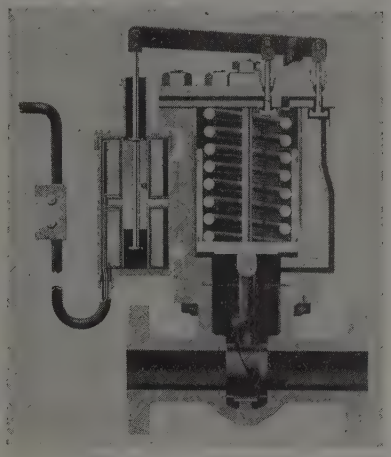
Built to precise instrument standards, the device is available in two ranges: For a dew point between minus 20°F and room temperature; and from minus 100°F to 0°F.

16. Valve Control

Air, water, oil, gas, steam—at high or low pressure and temperatures—may be handled with the valve control announced by Shafer Valve Co. Inc., Mansfield, O. Electric type is actuated by a solenoid mechanism on either 110 or 220 v, ac or dc, using current only when opening or closing. Opening may be either fast or slow. When applied to gate valves, the valve may be installed with either side to the upstream pressure.

Valve control may be modified to operate either electrically or by fluid pressure; instrument control actuated by pressure, temperature, or time variations may be installed. Several types of automatic safety shut-offs are offered: Shut off or unloading in case of power failure; protection against line failure or blowout, a predetermined drop in pressure closing the valve; and a manually operated unit which may be connected with a float level control to regulate volume of liquid in a tank.

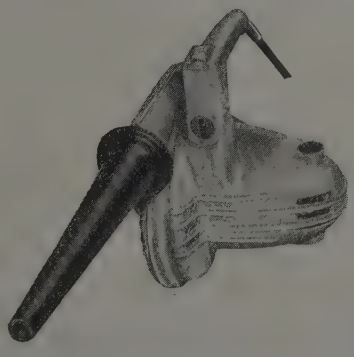
Either an electric or pressure controlled valve may be operated manually



at any time. Valve controls are available for operation of valves from 1 in. up, and for pressures ranging from 25 to 6000 lb.

17. Cleaner-Blower

Ideal Industries Inc., 5076 Park avenue, Sycamore, Ill., is manufacturing a portable electric cleaner-blower, capable of running continuously and powered by a 1 1/3-horsepower motor. Blowing air at the velocity of 25,500 feet per minute,



the 14½-pound unit performs a number of operations, such as blowing, vacuuming, spraying and drying. It is also made in a smaller model, with a 2/3-horsepower motor displacing air at 19,000 feet per minute.

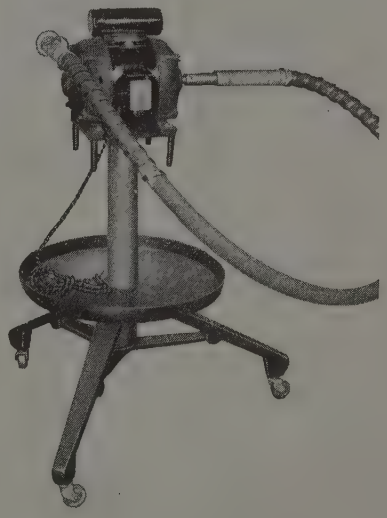
While vacuuming, dirt is sucked into a bag attached to the unit. For drying, a heater nozzle may be attached, raising the air flow temperature to a minimum of 85°F. High air velocity makes it suitable for blowing dirt from inaccessible locations, such as in air conditioning, refrigeration and heating units where dirt is often oil soaked and heavy.

18. Safety Goggle

Designed for work in hot and humid atmospheres where chemical and dust hazards exist, a new rubber framed safety goggle, announced by American Optical Co., Southbridge, Mass. features a nosepiece with an inhalation and exhalation valve to prevent fogging and steaming of its large acetate single lens. When wearer inhales, air sweeps through the chamber, removing moisture on the inner lens. Inlet valve closes when exhaling.

19. Flexible Shaft Machine

Adaptable for disk and drum sanding, drilling, wire brushing and polishing, the flexible shaft machine, known as Aristo-



Craft Power Shaft, made by Aristo Power Tools Inc., 601 West Washington boulevard, Chicago 6, has an armored shaft casing which prevents sharp bends. Tool has a ½ hp motor with capacitor.

Design permits lifting the motor assembly from the dolly stand on which it is mounted. Motor assembly base has four rubber feet to permit standing on bench or floor. It may also be suspended by rope or chain.

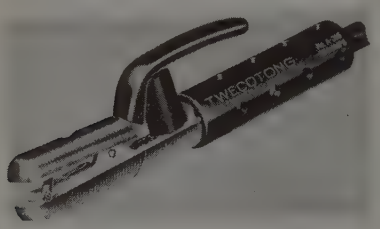
20. Welding Electrodes

Electrodes designed for all position welding of thin gage steels with direct current (straight polarity) or alternating current, and designated as Agile-Brown by the manufacturer, American Agile Corp., 5808 Hough avenue, Cleveland 3, feature soft arc action, minimum penetration and low spatter loss. Agile Red-White electrodes are designed for all position welding of mild steel at high-

est speeds and may be applied at highest current settings, even on poorly fit up assemblies. Results give fast rate of weld without undercutting and a minimum of spatter loss.

21. Electrode Holder

Light weight, compactness and ease of operation with a 95-pound bite on a 3/16-inch electrode are features of the model A-316 Twecotong electrode holder made by Tweco Products Co., P. O. Box 666, Wichita 1, Kan. Tip and body in-



sulation is molded laminated glass cloth bakelite using a tubular keyed design. Its insulated spring is neoprene covered and the cable connection is a clamp, plus a socket for soldering.

Weighing 18 ounces and rated for 250 amperes it will hold electrodes of from 1/16 to 3/16-inches. Holder's length is 9 inches and its palm span is 2¾-inches.

22. Light Reflector

Designed for instant attachment or removal to simplify cleaning, the Diskonect reflector, made by Goodrich Electric Co., Chicago, is equipped with a spring lock requiring only thumb pressure for release. Reflector, socket and lamp are removed as a unit. To attach, it is necessary only to press reflector back into the hood. Mechanical and electrical connections are made at same time.

23. Log Slide Rule

With a metal body for durability and stability and black and white scales for accuracy and legibility, the Deci-Log slide rule, made by Burrell Technical Supply Co., 1936-42 Fifth avenue, Pittsburgh 19, has powers (including those of base e) with both positive and negative exponents which may be read with one setting of the hairline. Square root scale is double the length of the rule's C scale and cube root scale is triple the C scale. It is furnished with manual and carrying case.

24. Electric Furnace

Equipped to provide accurate heat control, a necessary factor in developing the finest physical and chemical properties in melting aluminum, brass and bronze, the model PF-2121 electric pot furnace, manufactured by Pereny Equipment Co., Columbus, O., has a working capacity of 275 lb of aluminum.

Molten metal may be ladled directly from the furnace into die casting machines or the crucible may be removed with tongs. Size of unit is 49¾-in. wide, 37¼-in. deep and 44⅛-in. high. Maximum power input is rated at 34.3 kw.

25. Check Valves

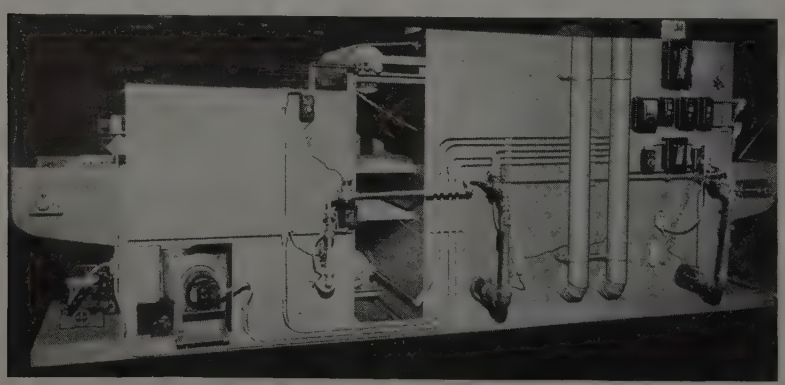
Embodying no metallic operating parts to stick, slam, chatter or leak, a line of check valves offered by Grove Regulator Co., 65th and Hollis streets, Oakland, Calif., operates on low pressure differential. Chexflo valves have tough flexible tubular operating member, comprised of a thick load section, tapering down to a sensitive operating lip, which requires no differential pressure to effect bubble tight shut-off. They are available in sizes ranging from ½ to 12 inches.

26. Washing Machine

Three cycles of the machine for processing of light, small, cup-shaped stampings of comparatively uniform depth, made by Mabor Co., Clark Township, Rahway, N. J., include washing, rinsing and a section wherein parts are dried. The hold-down conveyor may be adjusted to accommodate various types of parts.

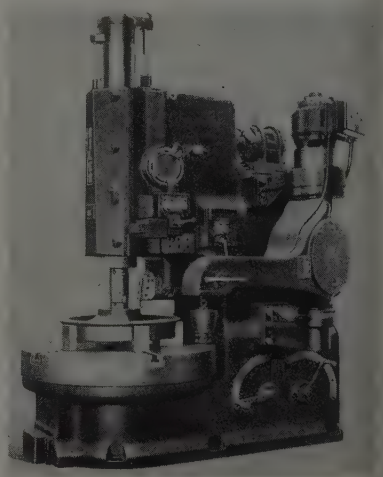
Machine illustrated is gas heated by immersion combustion burners, although any heating method can be utilized. Any one of the three processing stages may be eliminated or additional processing stages may be added to bring parts nearer to point where they may be used for assembly.

Pumps are close-coupled and air heat device is direct fired, although indirect firing may be substituted. Gas burners and temperatures are equipped with automatic safety devices.



27. Wheel Borer

In a five-step automatic cycle, the 48-inch hydraulic wheel borer manufactured by Niles Tool Works Division of General Machinery Corp., Hamilton, O., roughs, finish machines, chamfers the bore, and faces the hub of cast iron or steel wheels. After its feed dials have been set for the desired operation, only three separate



controls need be operated to bore individual wheels. Feed selections within the range of the machine make it possible to select the most efficient feed for the speed and material.

Boring ram first approaches the position where the roughing cut starts and automatically changes from fast traverse to a roughing feed. Upon completion of roughing, finishing cutters come into position and feed automatically changes. Next feed change is for chamfering and an adjustable time delay begins to operate, the boring arm being held in this position while chamfer is completed. After this operation, the main motor is de-energized and the brake brings the table to a stop. Boring bar then automatically returns by fast traverse to starting position.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

46. Machine Tools & Accessories

Zagar Tool, Inc.—26-page illustrated catalog and price list covers complete line of industrial tools and special machinery. Units included are 20 and 36-inch horizontal broaching machines, broaches and adapters, collets, fixtures, gearless multiple spindle drilling and tapping head, and other equipment. Complete data are given.

47. Die Casting Metals

Federated Metals Div., American Smelting & Refining Co.—Booklet covers characteristics and applications of various die casting alloys. It presents data on die casting processes; selection of alloys; general metallurgy of alloys; effects of impurities; melting of metals; and tables of SAE, Army, Navy and Aeronautical specifications.

48. Steam Generating Units

York-Shipley, Inc.—8-page illustrated catalog No. ID-47-8 deals with Steam-Pak oil-fired steam generating equipment and industrial burners. Units are fully automatic and self-contained. High and low pressure series are available and eleven models in each series provide various shapes for wide range of applications. Maintenance, oil metering pump, boiler construction and electric preheating are discussed.

49. Silicone Oils

Dow Corning Corp. — 8-page "Preliminary Data Sheet On Silicone Notes" deals with DC 710 Silicone oils developed especially for high temperature lubrication from 10 to 500 F. Variations of this lubricant are available for use on mechanisms continually exposed to heat, high humidity or weather. Oils can be used also as high temperature bath fluid and as high temperature hydraulic fluid.

50. Adjustable Speed Drive

Reliance Electric & Engineering Co.—4-page illustrated bulletin No. 311-A covers all-electric adjustable-speed drives in 40 to 200-horsepower range. Features include stepless speed changes over entire range, controlled acceleration and deceleration, reversing, jogging, threading and quick stopping, all controlled by pushbutton.

51. Grinding Spindles

Ex-Cell-O Corp.—80-page illustrated catalog No. 25962 lists precision grinding spindles, spindle brackets and quills, and includes application data. Units for old and new machines are considered. Spindles for internal, universal, surface, tool and cutter and special grinders are shown. Both belt driven and inbuilt motor spindles are covered.

52. Oil Burning Equipment

York-Shipley, Inc.—12-page illustrated bulletin No. ID-46-6 entitled "Precision Combustion" details features of oil-fired heating equipment. Features include simple flame adjustment, precision air-oil control and pressure type igniter.

53. Industrial Air Compressors

Davey Compressor Co. — Illustrated leaflet describes line of Air Chief industrial air compressors. Mechanical data and specifications on departmental units of 60, 105, 160, 210 and 315-cubic foot per minute capacities are given.

54. Welding of Nickel Alloys

International Nickel Co.—16-page illustrated booklet No. 186C covers materials required for metal-arc, oxyacetylene and submerged melt welding of nickel and high nickel alloys. Information on types of rods to use, recommended amperage and proper flux is given.

55. Lubricants

E. F. Houghton & Co.—Two 4-page illustrated folders, No. 2-295 entitled "Sta-Put Rock Drill Lubricants" and No. 2-290 entitled "Sta-Put Lubricants for Pneumatic Tools" describe how and why these lubricants overcome adverse conditions usually encountered in pneumatic tool operation.

56. Gasoline Engines

Wisconsin Motor Corp.—4-page illustrated bulletin No. VP4-47-3 describes models VM4 and VP4 heavy duty air cooled V-type, 4-cylinder gasoline engines. Horsepower ratings of these two models range from 20.2 and 23.5 at 1400 revolutions per minute to 27 and 31 at 2200 revolutions per minute respectively.

57. Precision Chuck

Edward Blake Co.—4-page illustrated bulletin describes University Bordjaw chuck No. 2. This small-lathe precision chuck employs bored-jaw method of holding work and permits small lathes to accommodate collet work up to 2 inches in outside diameter. Spindle thread of 1½ inches, 8 threads per inch, is employed.

58. Press Brakes

Cyril Bath Co.—40-page illustrated catalog No. S-1000 describes Sturdy-bender power press brakes in capacities from 60 to 120 tons. Construction, specifications, dies, backgages and other auxiliary equipment are described. Case and cabinet forming machinery are also described briefly.

59. Slurry Pump

Pettibone Mulliken Corp.—16-page illustrated bulletin describes slurry pump wearing parts of which are centrifugally cast of abrasion resistant Diamond alloy. Mechanical features of pump, together with specifications and other data, are covered.

60. Extrusion Presses

Lombard Corp. — 4-page illustrated folder presents information on Lombard extrusion presses of four-column hydraulically operated type. Features, examples of work and other data are given.

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61. Sanitary Equipment

Duriron Co.—12-page illustrated bulletin No. 703 covers corrosion resistance, proper installation and use of Duriron acid-proof sinks, sink strainers, traps and sanitary pipe and fittings. Check list of uses is presented and specification requirements are discussed.

62. Tapping Machine

Procunier Safety Chuck Co.—Illustrated brochure shows series A tapping machines equipped with Hi-Boy lubricating pump. Pump is motor-driven gear type and provides continuous flow of lubricant to tap. Also shown is new foot operating mechanism for presetting tap driving and reversing pressures.

63. Underground Passageways

Armco Drainage & Metal Products, Inc.—24-page illustrated manual covers construction of underground passageways for people, livestock, merchandise or utility lines. Data on size and shape of openings, available metal structures and suggestions on floors, drainage, lighting, brackets and end treatment are given.

64. Alloy Steels

Jessop Steel Co.—12-page technical bulletin entitled "Jessop Stainless and Heat Resisting Steels" covers chemical analyses, physical properties, corrosion resistance ratings, and fabricating properties of standard types of chromium-nickel and chromium alloy steels.

65. Bending Machines

Pines Engineering Co.—18-page illustrated catalog "Pines Benders" describes line of bending machines equipped with finger tip control to produce widely diversified bends in all shapes and sizes of materials to a high degree of accuracy. Engineering features of various models and basic principles of bending practices are covered.

66. Industrial Equipment

Hill Acme Co.—3-page illustrated folder briefly describes hydraulic precision surface grinders; plate, sheet and strip grinding and polishing machines; alligator shears for industrial scrap; shear blades; portable shop cranes; solid and laid steel shear blades; rotary slitting and side trimming knives; metal cutting knives and knife sharpening service; forging, threading and tapping machines; threading dies; and bolt, nut and rivet machinery.

67. Burs & Accessories

Pratt & Whitney Div., Niles-Bement-Pond Co.—40-page illustrated book entitled "Keller Burs and Accessories" describes line of burs for all purposes and in all shapes. Sanding and polishing drums, abrasive belts, sanding disks, grinding wheels, mounted stones, arbors, pencil stones and Crystolon sticks, felt polishing wheels, wire brushes and mill cable are covered also. Resharpening and engineering services are outlined.

68. Screw Machine Products

Defiance Screw Machine Products Div., Serrick Corp.—4-page illustrated folder shows plant facilities for producing wide range of screw machine products, stampings and subassemblies on contract.

69. Protective Coating

Industrial Metal Protectives, Inc.—16-page catalog "Zincilate, The Self-Protecting Coating" describes this material as having resistance to mild acids, mild alkalies and extreme weathering conditions. It can be applied with brush or spray. Steels protected with Zincilate are said to withstand salt spray treatment for 1000 hours.

70. Special Machinery

Foote Bros. Gear & Machine Corp.—12-page illustrated bulletin No. 6298 describes special machinery made to specification. Equipment illustrated includes lock and dam machinery, gate and valve lifts and bridge operating machinery involving standard or special mechanical drive equipment.

71. Polishing Contact Wheels

Manderscheid Co.—Presto bulletin No. 105 outlines advantages of improved Neoprene contact wheels made in wide range of densities and sizes for use in abrasive belt polishing.

72. Speed Reducing Drives

American Pulley Co.—16-page illustrated catalog No. R-47 depicts typical installations of reduction drives and presents information on how to select proper drive for any given application. Dimension tables and list prices are included. Drive selection table charts output speed and ratios attainable.

73. Control & Transfer Switch

General Electric Co.—12-page illustrated booklet No. GEA 4746 describes type SB-1 control and transfer switch equipped with standard cams, contacts, fingers and other parts which offers unlimited combinations of opening, closing and transferring of low-capacity electric circuits. Construction, characteristics and applications are covered.

74. Press Brake

Dual Press Co.—8-page illustrated catalog "The Efficient All Steel Dual Press Brake" describes this unit recommended for bending, forming, blanking and multiple punching operations. Specifications for some 30 models are included ranging in forming capacity from 4-foot 12-gage mild steel to 16-foot ⅜-inch mild steel.

75. Buffing & Polishing Machines

Standard Electrical Tool Co.—16-page illustrated catalog No. B-10 presents information on line of heavy duty and extra heavy duty buffing and polishing machines in sizes ranging from ½ to 60 horsepower. Line of infinitely variable speed buffing and polishing machines equipped with Speedial control for obtaining speeds from 1500 to 3000 revolutions per minute is also described.

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Steel Price Stability Seen Threatened by Freight Rise

Higher delivered and warehouse prices likely to be immediately effected in event railroads' application for emergency boost of 10 per cent is granted. Mill base prices seen rising with raw material assembly costs. Talk heard of stricter steel allocation with shortages promising to continue into 1949

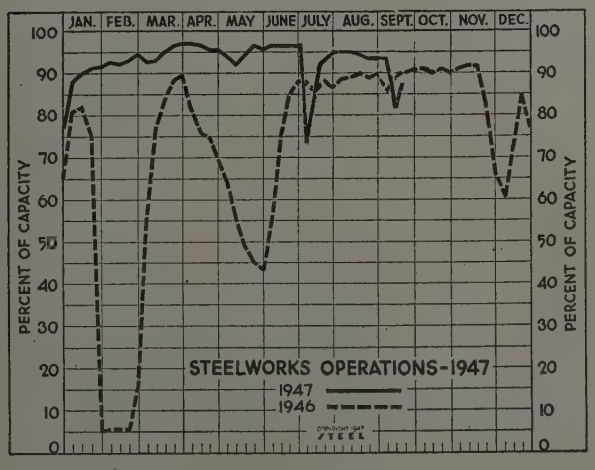
JUST when it appeared the steel market had settled down to a period of relative price steadiness, a new threat to stability developed last week in the application of the railroads for a 10 per cent emergency freight rate increase.

In event this request is granted it does not necessarily follow mill base prices on steel products will immediately rise. However, market observers point out that such an increase would be promptly reflected in higher prices on shipments from warehouses, and at the same time delivered prices to consumers generally would be upped. Eventually, mill base prices would be forced higher to compensate for increased raw material costs.

Currently steel prices are steady except for a few changes in extra cards by independent producers.

Hiking of warehouse prices alone would hit a broad area of the consuming market severely since several hundred thousand small buyers are dependent upon distributors for supplies, something like 16 per cent of total steel output for sale currently moving through the warehouses into consumption.

Possibility of a freight rate increase has resulted in some further pressure for steel deliveries, especially tonnage behind on delivery. Actually, however, higher freight cost is of relatively small consideration in light of consumers' urgency for steel. Major flat rolled products have never been in more critical supply. The plate situation is reminiscent of wartime except for character of demand, with heavy ship requirements lacking but a diversity of demand taxing rolling capacity to the limit. Pipe mills confront far greater volume than they can handle reasonably soon, and hot-rolled carbon bar and shape producers are behind on shipments. In fact, about the only products in fairly easy supply are alloy bars; tool steel; stainless sheets, strip, bars and wire; cold-drawn bars; certain wire products, including rope; and forgings.



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Sept. 20	Change	Same Week 1946	Same Week 1945
Pittsburgh	71	+24	97.5	74
Chicago	92.5	— 1	90	88
Eastern Pa.	92	None	81	76
Youngstown	92	None	89	89
Wheeling	93.5	None	93.5	94
Cleveland	92.5	+ 1.5	91	85
Buffalo	88.5	None	90.5	81.5
Birmingham	99	None	99	95
New England	85	+ 5	95	80
Cincinnati	94	None	81	81
St. Louis	78	— 4	65.5	68
Detroit	91	None	86	87
Estimated national rate	87.5	+ 5.5	90	83

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762.381 net tons for 1946; 1,831,636 tons for 1945.

Little relief in the tight supply situation in the major products is in prospect. Testimony of leading producers at the Senate Small Business Committee's steel hearing that shortages would likely be experienced until 1949 provided consumers little comfort, though the fact considerable new steel producing and rolling capacity will come into operation over coming months gives some hope supply will gradually improve. Some talk of tighter allocation of steel, possibly under government directive but more likely by voluntary action of steel producers, is heard currently. The idea seems to be the government will be compelled to force stricter rationing to assure sufficient tonnage for essential domestic requirements and provide steel needed for Europe under the Marshall Plan.

Last quarter consumer steel allotments will be further cut as a result of the recent loss of production in the Pittsburgh district caused by the recent wildcat strike of steel plant railroad workers. While the strike lasted only eight days, it is estimated Carnegie-Illinois Steel Corp. lost 250,000 tons of ingots and 155,000 tons of finished steel. Plate output was hardest hit, the loss exceeding 40,000 tons. At the close of last week operations at Pittsburgh district coke ovens, blast furnaces and openhearths had been restored to prestrike status.

Steelmaking operations advanced last week, the national ingot rate rising 5½ points to 87.5 per cent of capacity. Pittsburgh operations, recovering from the railroad strike, were up 24 points to 71 per cent of capacity. Cleveland and New England also gained, being up 1½ points to 92.5 per cent and 5 points to 85 per cent, respectively. Declines were noted in Chicago of 1 point to 92.5 per cent and in St. Louis of 4 points to 78 per cent.

STEEL's finished steel price composite remained unchanged last week at $75.41. Composites for semifinished steel and steelmaking scrap likewise were steady at $56.80 and $37.83, respectively. Steelmaking pig iron, however, moved upward 4 cents to $36.13.

COMPOSITE MARKET AVERAGES

	Sept. 20	Sept. 13	Sept. 6	One Month Ago Aug., 1947	Three Months Ago June, 1947	One Year Ago Sept., 1946	Five Years Ago Sept., 1942
Finished Steel	$75.41	$75.41	$75.41	$75.41	$69.82	$64.45	$56.73
Semifinished Steel	56.80	56.80	56.80	56.80	52.10	40.60	36.00
Steelmaking Pig Iron	36.13	36.09	36.20	36.06	32.49	27.50	23.00
Steelmaking Scrap	37.83	37.83	37.83	39.00	32.48	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Sept. 20, 1947	Aug, 1947	June, 1947	Sept., 1946
Steel bars, Pittsburgh	2.90c	2.90c	2.60c	2.50c
Steel bars, Philadelphia	3.28	3.28	2.98	2.86
Steel bars, Chicago	2.90	2.90	2.50	2.50
Shapes, Pittsburgh	2.80	2.80	2.50	2.35
Shapes, Philadelphia	2.94	2.94	2.64	2.48
Shapes, Chicago	2.80	2.80	2.50	2.35
Plates, Pittsburgh	2.95	2.95	2.65	2.50
Plates, Philadelphia	3.15	3.15	2.85	2.558
Plates, Chicago	2.95	2.95	2.65	2.50
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.50	2.425
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.20	3.275
Sheets, No. 10 galv., Pittsburgh	3.90	3.90	3.55	†4.05
Sheets, hot-rolled, Gary	2.80	2.80	2.50	2.425
Sheets, cold-rolled, Gary	3.55	3.55	3.20	3.275
Sheets, No. 10 galv., Gary	3.90	3.90	3.55	†4.05
Strip, hot-rolled, Pittsburgh	2.80	2.80	2.50	2.45
Strip, cold-rolled, Pittsburgh	3.55	3.55	3.20	3.05
Bright basic, bess. wire, Pittsburgh	3.675	3.675	3.425	3.05
Wire nails, Pittsburgh	4.25	4.25	4.125	3.75
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$50.00	$38.00
Slabs, Pittsburgh, Chicago	47.50	47.50	42.00	39.00
Rerolling billets, Pittsburgh	47.50	47.50	42.00	39.00
Wire rod ⅜ to ¼-inch, Pitts.	2.925c	2.925c	2.55c	‡2.30c

‡ Base, No. 5 to ⅝-in.

Pig Iron

	Sept. 20, 1947	Aug, 1947	June, 1947	Sept., 1946
Bessemer, del. Pittsburgh	$37.83	$37.83	$34.83	$29.77
Basic, Valley	36.00	36.00	33.00	28.00
Basic, eastern del. Philadelphia	38.72	38.72	35.52	29.93
No. 2 fdry., del. Pgh. N. & S. sides	37.33	37.33	34.33	29.27
No. 2 fdry., del. Philadelphia	39.22	39.22	36.02	30.43
No. 2 foundry, Chicago	36.00	36.00	33.00	28.50
No. 2 foundry, Valley	36.50	36.50	33.50	28.50
Southern No. 2, Birmingham	34.88	34.51	29.88	24.88
Southern No. 2, del. Cincinnati	39.75	39.38	34.75	28.94
Malleable, Valley	36.50	36.50	33.50	28.50
Malleable, Chicago	36.50	36.50	33.50	28.50
Charcoal, low phos., fob Lyles, Tenn.	44.00	44.00	40.50	33.00
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.25	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$38.00	$39.875	$32.44	$20.00
Heavy melt. steel, No. 2, E. Pa.	36.75	38.35	33.38	18.75
Heavy melt. steel, No. 1, Chicago	38.75	39.625	30.75	18.75
Heavy melt. steel, No. 1, Valley	40.00	40.50	34.06	21.00
Heavy melt. steel, No. 1, Cleveland	38.25	38.81	32.38	19.50
Heavy melt. steel, No. 1, Buffalo	39.50	40.88	32.00	19.25
Rails for rerolling, Chicago	46.25	47.125	38.75	22.25
No. 1 cast, Chicago	43.50	43.50	39.50	23.75

Coke

Connellsville, beehive furnace	$12.00	$12.00	$9.56	$8.75
Connellsville, beehive foundry	14.50	14.50	10.75	9.50
Chicago, oven foundry, del.	18.50	18.50	16.10	15.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $45-$50, sales by smaller interests on negotiated basis at $65 or higher. Detroit, del., $53; eastern Mich., $54.

Forging Quality, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $55-$58; Detroit, del., $61; eastern Mich., $62.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69, eastern Mich., $70.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $60; sales by smaller interests on negotiated basis at $66 or higher.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69.

Wire Rods: Pittsburgh, Chicago, Birmingham, ⅜ to ¼-in., inclusive $2.80-3.05 per 100 lb. Galveston base, $2.95. Worcester, 2.90c. San Francisco (base del.), $3.52.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.90c; Detroit, del., 3.05c; eastern Mich., 3.10c; New York, del., 3.31c; Phila., del., 3.28c; San Francisco (base, del), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.58c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.45c; eastern Mich., 3.50c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.70c; Toledo, 3.75c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.25c; eastern Mich., 4.30c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base price upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c; double refined, 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; Philadelphia, del., 3.00c; New York, del., 3.09c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit. Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent.

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.70c; eastern Mich., del., 3.75c; New York, del., 3.96c; Philadelphia, del., 3.93c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.85c-3.95c; Granite City, 4.05c; New York, del., 4.24c; Philadelphia, del., 4.15c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 3.95c-4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc), corrugated 10 cents extra; Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.45c-4.55c; copper-iron or pure iron, 4.80c-4.90c. Granite City base prices 10 points higher. Los Angeles (base, del.), 5.24c; San Francisco (base, del.) 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.85c-4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.90c-3.95c; Granite City, base, 4.05c; Detroit; del., 4.10c; eastern Mich., 4.15c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c. Electrical: Pittsburgh, Chicago, Gary, 5.30c; Granite City, Kokomo, 5.40c. Motor: Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c. Dynamo: Pittsburgh, 6.75c; Granite City, 6.85c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; San Francisco (base del.), 3.605c; Los Angeles (base del.), 3.60c.

Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.70c; eastern Mich., 3.75c; Worcester, base, 3.75c-4.10c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.00, 7.15c; over 1.00, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.90c; Granite City, Birmingham, Sparrows Point, 4.00c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $14.10.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, Claymont, 3.15c; Geneva, Utah, 3.10c; New York, del. 3.24c; Phila., del., 3.15c; St. Louis, del., 2.77c; Boston, del., 3.38c; San Francisco and Los Angeles, del. (sizes and grades produced at Geneva only), 3.59c.
(Central Iron & Steel Co., Harrisburg, Pa., 4.15c, basing points.)

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.00c; Phila., del., 2.94c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41c-3.47c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.44c; Kaiser, del., San Francisco, 3.41c.
(Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, fob Phoenixville.)

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.55–3.80
Spring (except Birmingham)	**$4.25–**4.50

Wire Products to Trade

Nails

Standard and cement-coated	†$4.25
Galvanized	‡$4.00
Staples, polished and galvanized	$4.25

Wire, Merchant Quality

Annealed (6 to 8 base)	§$4.20
Galvanized (6 to 8 base)	§§$4.65

(Fob Pittsburgh, Chicago, Birmingham, per base column)

Woven fence, 15 gage and heavier	††91
Barbed wire, 80-rod spool	††101
Barbless wire, twisted	101
Fence posts (no clamps)	††90
Bale ties, single loop	††91

* Worcester, $3.65, Duluth, $3.60, base. San Francisco (base, del) $4.56 for bright basic only.

** Worcester $4.60, Duluth and Trenton, N. J., $4.75, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

† Worcester $4.55, Cleveland $4.35, base. San Francisco (base, del.) $5.33.

‡ Duluth $4.00, Cleveland $4.10, base. San Francisco (base, del.) $5.08.

§ Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed; $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66, galvanized.

†† San Francisco (base, del.): Woven fence, 114; barbed wire, 121; bale ties, 115. Duluth (base): Woven fence, 91; barbed wire, 101; fence posts 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $55-$56 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.05 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars, $3.25 per 100 lb, fob mill. Standard spikes, 4.00c-4.50c; screw spikes, 5.80c-6.40c. Axles, 4.10c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld				
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	49	34	48½	33½	48	33
2½-3	52	37	51½	36½	51	36
3½-6	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D. Sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1″	13	....	$11.87	$11.51	$11.51
1¼″	13	....	14.06	11.48	13.64
1½″	13	$13.08	15.69	12.69	15.22
1¾″	13	14.88	17.85	14.43	17.31
2″	13	16.67	19.99	16.17	19.39
2¼″	13	18.58	22.29	18.02	21.62
2¼″	12	20.47	24.54	19.86	23.80
2½″	12	22.42	26.87	21.75	26.06
2¾″	12	23.76	28.48	23.05	27.63
3″	12	24.93	29.90	24.18	29.00
3¼″	11	29.03	34.81	28.16	33.77
3½″	11	31.17	37.39	30.23	36.27
4″	10	38.69	46.38	37.53	44.99
4½″	9	51.28	61.50	....	....
5″	9	59.39	71.18	....	....
6″	7	91.13	109.27	....	....

Pipe, Cast Iron: Class B, 6-in. and over $74.50 per net ton, Birmingham; $79.50, Burlington, N. J.; $85.06, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B. Prices effective as of July 24, 1947.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	48 off
⅝ and ⅝ x 6-in. and shorter	50 off
Larger diameter; longer than 6 in.	47 off
Tire bolts	38 off
Step bolts	46 off
Plow bolts	57 off
Lag bolts	
¼ in. up to 1 in., 6 in. and shorter.	50 off
¼ in. up to 1 in., longer than 6 in.	48 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
7/16-in. and smaller	51 off	....
½-in. and smaller	....	50 off
½-in.-1-in.	48 off	....
⅝-in.-1-in.	....	49 off
1⅛-in.-1½-in.	46 off	47 off
1⅝-in. and larger	....	40 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in. smaller (10-20 bright)	56 off
Upset (10-35 heat treated)	
⅝ x 6	51 off
¾, ⅞, & 1 x 6	47 off

Square Head Set Screws

Upset 1-in. and smaller	61 off
Headless, ¼-in. and larger	46 off
No. 10 and smaller	56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural	5.25c
Lebanon, Pa.	5.40c
7/16-in. and under	55-5 off
Lebanon, Pa.	55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl $1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
*501	9.00	13.00	17.50	13.00	18.50
*502	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304	....	24.00	22.00	....	....
410	....	22.00	20.00	....	....
430	....	22.50	20.50	....	....
446	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$37.50	$37.00	$38.50	$38.00
Newark, N. J., del.	39.34	38.84	40.34	39.84
Brooklyn, N. Y., del.	40.50	....	....	41.00
Philadelphia, del.	39.22	38.72	40.22	39.72
Birdsboro, Pa., base	40.50	40.00	41.50	41.00
Birmingham, base	33.38*	32.88*	....	....
Baltimore, del.	39.78	....	....	....
Chicago, del.	37.12	....	....	....
Cincinnati, del.	38.25	....	37.75	....
Newark, N. J., del.	39.46	....	....	....
Philadelphia, del.	38.84	....	....	....
St. Louis, del.	37.37	....	36.87	....
Buffalo, base	*36.00	*36.00	37.00	*36.50
Boston, del.	42.48	42.48	43.48	42.98
Rochester, del.	37.84	37.84	38.84	38.34
Syracuse, del.	38.50	38.50	39.50	39.00
Canton, Massillon, O., base	36.00	35.50	....	36.50
Chicago, base	36.00	35.50	37.00	36.50
Milwaukee, del.	37.32	36.82	38.32	37.83
Muskegon, Mich., del.	39.83	....	....	40.33
Cleveland, fob furnace	*36.00	*35.50	37.00	*36.50
Akron, del.	37.67	37.17	38.67	38.17
Duluth, base	36.50	36.00	37.50	37.00
Erie, Pa., base	36.00	35.50	37.00	36.50
Everett, Mass., base	45.00	....	....	45.50
Granite City, Ill., base	37.00	36.50	....	37.00
St. Louis, del.	37.75	37.25	....	37.75
†Neville Island, Pa., base	36.50	36.00	37.00	36.50
Pittsburgh, del., N.&S. Sides	37.33	36.83	37.83	37.33
Provo, Utah, base	36.50	36.00	....	....
Seattle, Tacoma, Wash., del.	41.60	....	....	....
Portland, Oreg., del.	41.60	....	....	....
Sharpsville, Pa., base	36.50	36.00	37.00	36.50
Steelton, Pa., base	37.50	37.00	38.50	38.00
Struthers, O., base	37.00	36.50	37.50	37.00
Swedeland, Pa., base	41.50	41.00	42.50	42.00
Troy, N. Y., base	38.00	37.50	39.00	38.50
Toledo, O., base	36.00	35.50	37.00	36.50
Cincinnati, del.	39.50	39.00	....	....
Youngstown, O., base	36.50	36.00	37.00	36.50
Mansfield, O., del.	39.48	38.98	39.98	39.48

† To Neville Island base add: 66c for McKees Rocks, Pa., $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

* Republic Steel Corp., quotes $3 a ton higher at Birmingham, effective Aug. 13; $2.00 higher at Buffalo for No. 2 foundry and malleable and $1.50 higher for basic and $2.75 higher at Cleveland, effective on shipments during week ended Sept. 21.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)	$45.50		
6.51-7.00	$46.75	9.01- 9.50	53.00
7.01-7.50	48.00	9.51-10.00	54.25
7.51-8.00	49.25	10.01-10.50	55.50
8.01-8.50	50.50	10.51-11.00	56.75
8.51-9.00	51.75	11.01-11.50	58.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.01-14.50%, $72.50, Jackson, O.; $73.75, Niagara Falls; $78, piglets, $76, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$44.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $36.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $42.00; Birdsboro, Pa., $45 base; Philadelphia, $44.22, del. Intermediate phosphorus, Central furnace, Cleveland, $39.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$11.50-$12.50
Connellsville, foundry	14.00- 15.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$17.85
Chicago, outside del.	17.50
Chicago, del.	18.50
Terre Haute, del.	18.05
Milwaukee, Ovens	18.25
New England, del.	19.50
Birmingham, del.	15.00
Indianapolis, ovens	17.00
Cincinnati, del.	16.50
Ironton, O., ovens	15.50
Painesville, ovens	16.60
Cleveland, del.	17.90
Buffalo, del.	18.25
Detroit, del.	17.65
Philadelphia, ovens	16.75
Swedeland, Pa., ovens	16.75
Portsmouth, O., ovens	16.00
Fairmont, W. Va., ovens	15.75
Pittsburgh, del.	17.61

Coal Chemicals

Spot, gal. freight allowed east of Omaha. Effective as of Apr. 1, 1947.

Pure and 90% benzol	19.00c
Toluol, two degrees	23.00c
Industrial xylol	23.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "house-hold use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low-Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Dolomite

Domestic, dead-burned, bulk, net ton, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg or Woodville, O., $10.55; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos	Nom.
Swedish basic, 60 to 68%	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$32–$34

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30*	5.30*	5.30	...	...	...	...	...
Shapes Structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

*Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½" & up	H-R Alloy (§4140)	Structural Shapes	Carbon ⅝"-¾"	Floor ¾" & Thicker
Boston (city)	4.90	5.97[4]	5.67[4]	6.10[4]	7.35[4]	4.97	6.71	4.92	5.57	7.17	4.77	5.05	6.72
††New York (city)	4.87	6.07	5.77[8]	6.07	7.32	4.97	....	4.97	5.52	6.97[9]	4.72	5.02	6.70
New York (country)	4.72	5.92	5.62[8]	5.92	7.17	4.82	....	4.82	....	....	4.57	4.87	6.55
Philadelphia (city)	4.64	6.23[9]	5.83[9]	5.84	7.09	4.73	5.63	4.78	5.48	6.92[9]	4.52	4.79	6.18
Philadelphia (country)	4.54	6.13[9]	5.73[9]	....	....	4.63	5.53	4.68	....	6.82[9]	4.42	4.69	6.03
Baltimore (city)	4.29†	5.85[8]†	5.55[8]†	5.54	6.79	4.70	....	4.75	5.45	....	4.64	4.74	6.20
Baltimore (country)	4.19†	5.75[8]†	5.45[8]†	5.35	6.60	4.60	....	4.65	....	....	4.54	4.64	6.10
Washington (city)	4.75	....	....	....	....	4.95	....	5.00	5.60[12]	....	4.90	4.95	6.60
Washington (country)	4.65	....	....	....	....	4.85	....	4.90	....	....	4.80	4.85	6.50
Norfolk, Va.	4.75	....	....	....	....	....	....	5.05	5.85	....	5.00	5.00	6.75
Memphis, Tenn. (city)	4.82§§	....	5.88	6.37	....	5.02	....	4.97	5.98	....	4.97	5.17	6.88
Memphis, Tenn. (country)	4.72§§	....	5.78	6.27	....	4.92	....	4.87	5.88	....	4.87	5.07	6.78
Buffalo (city)	4.45	....	5.20[6]	5.90	....	4.60	5.60	4.40	5.10	8.15	4.40	4.85	6.20
Buffalo (country)	4.30	....	5.05[6]	5.75	....	4.45	5.45	4.25	4.95	8.00	4.25	4.70	6.05
Pittsburgh (city)	4.25§§	....	5.10[8]†	5.65	6.90	4.35	5.35	4.40	5.10	10.65*†	4.40	4.60	5.90
Pittsburgh (country)	4.15§§	....	4.90[8]†	5.50	6.75	4.20	5.20	4.25	4.95	10.50*†	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.638	6.888	4.488	5.35	4.40	5.10	6.908	4.611	4.55	6.111
Cleveland (country)	4.30	5.35[8]	5.05[8]	....	....	....	5.20	4.25	4.95	....	....	4.40	....
Cincinnati (city)	4.671	5.516[8]	....	5.716	6.466	4.694	....	4.703	5.353	....	4.744	4.903	6.244
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.35	4.40	5.10	6.65[13]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50	6.75	4.20	5.20	4.25	4.95	6.65[13]	4.25	4.45	5.90
Milwaukee	4.599	5.649[8]	5.349[8]	5.799	7.049	4.499	5.599	4.549	5.249	6.949[9]	4.549	4.749	6.199
St. Louis	4.749	5.799[9]	5.499[5]	5.974	7.224	4.649	5.774	4.699	5.424[12]	7.124	4.699	4.899	6.349
Birmingham (city)	4.45[20]§§	....	....	5.80	....	4.45[20]	....	4.40[20]	5.93[22]	....	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	....	....	5.50	....	4.30[20]	....	4.25[20]	....	....	4.25	4.50	..
New Orleans	4.98[20]**	....	6.29[18]	....	....	5.18[20]	....	5.13[20]**	6.29[21]	....	5.03[20]**	5.33[20]	7.29[20]
Omaha, Nebr.	5.068	....	....	6.468	7.718	5.168	....	5.218	5.918	....	5.218	5.418	6.868
Seattle, Tacoma, Wash.	5.30[17]	....	7.10[5]	6.70	....	5.60[17]	....	5.30[17]	7.45[10]	8.50[13]	5.25[17]	5.45	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—any quantity; [2]—300 to 1999 lb; [3]—150 to 2249 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—one bundle to 1499 lb; [7]—one to nine bundles; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [10]—450 to 39,999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [13]—400 to 14,999 lb; [14]—400 to 89,999; [15]—2000 lb and over; [16]—1000 to 4999; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999; [20]—400 to 9999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled, except Indianapolis, Los Angeles, San Francisco where price represents annealed bars; ** add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier, *† heat treated.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburgh. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie - Illinois Steel Corp. is producer); add $8 for packed c.l., $15 for ton, $22 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn). Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8.40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.32; contract, $2.50; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High - Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

Ferrovanadium: V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 14.80c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22.00c, 0.2% 21.75c; 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l.; and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l.; and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c, and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; notched 0.25c higher.

Chromium Metal: 97% min. Cr, max, 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb to c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal, cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight

allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l., 14.10c; 2000 lb to c.l. 15.60c; central, 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn., max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Price per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80c, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western.

CMSZ Alloys 4 & 5: (Alloy 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract, bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80c, 15.55c, 19.05c, 19.80c, western.

Zirconium alloy: 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c.

Zirconium alloy: Z 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb carlots 6.50c; ton lots packed, 7.00c; 200 to 1999 lb, 7.75c; smaller lots, 8.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 98.8%, $3.05, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant; freight allowed on quantities of 25 lb and over to St. Louis.

Nonferrous Trading Dull; Prices Steady

Copper only metal to show summer production gain . . . Development of low-grade copper bodies expected

NEW YORK—Activity in the major nonferrous metals markets was at a crawl last week, prices on major metals holding firm at established levels and little trading noted. The only changes pricewise which occurred were in silver which again advanced and mercury which declined slightly on the open market.

Trade interest centers around the bids received last week by the Bureau of Supply, Treasury Department, for copper, lead and zinc. The bid opening was not a public affair, but government spokesmen said some offers had been received on the metals requested to augment the nation's stockpile. It is further reported the government agency is now inviting bids on cadmium in ingot and slab form, these to be made under the same conditions which applied to the bids received Sept. 15. Cadmium quotations to the government must be filed not later than Sept. 30.

COPPER — New development programs of copper producers featured the quiet market. Anaconda Copper Mining Co., New York, announced plans to spend $20 million over the next five years in a project to mine hitherto unprofitable low-grade copper ore. Under the program which will involve remodeling of the company's mill at Anaconda, Mont., it is expected that daily production of ore within five years can be increased by 15,000 tons, with realization of at least 20 lb of copper and substantial amounts of precious metals per ton of ore. The company said no problem with regard to smelting and refining the additional tonnages would arise.

Magma Copper Co., New York, is about to embark on the development of what is estimated to be the second largest copper ore body in the country. The San Manuel deposit, located about 50 miles northeast of Tucson, Ariz., has been the subject of much exploratory work by the company since 1944. The deposit which has been probed is more than a mile long, nearly a half mile wide and from 150 ft to 1500 ft thick, and is estimated to contain as much as 425 million tons of low-grade ore, making operations profitable only by its sheer bulk. The development program is expected to take five or six years or more.

Mine production of copper in the United States gained 4 per cent in July compared with June, reaching 73,177 short tons, according to the Bureau of Mines. Production during the first seven months of this year totalled 503,568 tons, or 74 per cent more than the 289,974 tons produced by mines in the corresponding period last year when mines were strike-affected. A substantial decline was suffered in refined copper deliveries in August, the Copper Institute reports. Domestic shipments of 96,304 tons were the smallest since June, 1946, being 13,500 tons less than in July, as a result of the lower operating rates of brass mills during the last few months. Of the lower tonnage shipped to consumers 95,157 tons was supplied by the industry and 1147 tons from the Office of Metals Reserve stockpile. Refined copper stocks changed little during the period, amounting to 76,009 tons against 77,773 tons as of July 31.

LEAD — Reconstruction Finance Corp., through its subsidiary, U. S. Commercial Co., is offering for sale approximately 1140 short tons of lead scrap received from Japan. The material, to be sold on a sealed bid basis in 24 lots, may be inspected at Seller's warehouse, Staten Island, N. Y., from Sept. 22 through Sept. 26. Requests for terms of sale must be made before Sept. 30.

Domestic mine production of lead in July was 9 per cent lower than in June, amounting to 28,736 short tons, according to the Bureau of Mines. This was the lowest output since December, 1946, the bureau reported. Activity at secondary lead smelters declined again in the previous month, receipts in June having fallen to 48,451 tons for the lowest figure of the year; weight of recovered metal, 41,117 tons, was still greater than that during any month of 1946, however.

SILVER—Mine production of silver was 2 per cent lower in July at 2,668,715 ounces, from June's output of 2,734,281 ounces, according to the Bureau of Mines. This was the smallest output in five months, the bureau said. Domestic production of refined silver during the same month dropped sharply to 3,662,000 ounces from 5,612,000 ounces in the previous month, and was the smallest output since June, 1946. Of the total production, 1,738,000 ounces was of foreign origin.

Handy & Harman's "official" price last week was 70.5 cents an ounce, compared with 70.25 cents the previous week.

ZINC—Domestic mine production of zinc dropped 20 per cent in July and was the smallest since August, 1946, totaling 48,140 short tons, according to the Bureau of Mines. A large part of the decline was attributed to the expiration of the Premium Price plan which brought about the closing of a number of mines and reclamation plants. Mine production so far this year, however, is about 20 per cent ahead of last year, 383,833 tons having been produced through July against 321,060 in the comparable period of 1946. The government stockpile held by the Office of Metals Reserve increased during the month, being calculated on July 31 as containing 161,812 tons of refined metal, compared with 157,652 tons on June 30. Ores and concentrates totaling 211,821 additions in July brought the government accumulation to 373,633 tons.

MERCURY—Price of mercury declined recently from $83 per flask for large lots to a range of $81 to $82 on the open market, New York, and from the range of $84 to $85 down to a spread of $83 to $84 for smaller lots.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, delivered Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 18.00c; 88-10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 22.00c; No. 1 yellow (No. 405) 14.50c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 14.00-14.50c; No. 12 foundry alloy (No. 2 grade) 13.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.50c; grade 2 (92-95%) 12.75c; grade 3 (90-92%) 12.00-12.25c; grade 4 (85-90%) 11.50-11.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $81-$84 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $17 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg); $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 70.50c, per ounce.

Platinum: $64-$67 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.46c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq. ft; 75c, 10 to 20 sq ft and circles. Pipe: Full coils 17.50c; cut coils 17.75c. Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb. 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb. 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: To all consumers; in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb. 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A, B	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.00, No. 2 copper 16.00, light copper 15.00, composition red brass 13.00-13.50, auto radiators 9.75-10.00, heavy yellow brass 9.00-9.50, brass pipe 9.75-10.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.25-18.50, No. 2 copper 17.00, light copper, 16.00, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 13.125.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.00, No. 2 15.00-15.25, light copper 14.00; No. 1 composition red brass 11.00-11.50, No. 1 composition turnings 10.50-11.00, mixed brass turnings 6.00-6.50, new brass clippings nom. 10.50-11.00, No. 1 brass rod turnings 9.00-9.50, light brass 5.50-6.00, heavy yellow brass 6.50-7.00, new brass rod ends 9.00-9.50, auto radiators, unsweated 8.50-9.00, cocks and faucets 8.00-8.50, brass pipe 8.00.

Lead: Heavy 11.50, battery plates 6.50-6.75, linotype and stereotype 12.25-12.50, electrotype 10.75-11.00, mixed babbitt 10.75-11.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.00, new die cast scrap 3.50-4.00, old die cast scrap 2.00-2.50.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S 8.00-8.50, old sheets 6.00-6.50, crankcases 6.00-6.50, borings and turnings 2.00-2.50, pistons, free of struts, 5.00-5.50.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$38.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Busheling	38.00
Nos. 1, 2 and 3 Bundles	38.00
Machine Shop Turnings	32.50-33.00
Mixed Borings, Turnings	32.50-33.00
Short Shovel Turnings.	34.50-35.00
Cast Iron Borings	34.50-35.00
Bar Crops and Plate	45.50-46.00
Low Phos. Steel	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Cut Structurals	44.50-45.50
Elec. Furnace Bundles.	43.50-44.50
Heavy Turnings	36.50-37.50

Cast Iron Grades

No. 1 Cupola	43.00-43.50
Charging Box Cast	40.00-40.50
Heavy Breakable Cast.	36.50-37.50
Stove Plate	34.50-35.50
Unstripped Motor Blocks	38.00-39.00
Malleable	49.50-50.50
Brake Shoes	35.00-36.00
Clean Auto Cast	40.00-41.00
No. 1 Wheels	42.00-42.50
Burnt Cast	32.00-33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00-42.50
R.R. Malleable	50.00-51.00
Axles	42.00-43.00
Rails, Rerolling	44.00-45.00
Rails, Random Lengths	43.00-44.00
Rails, 3 ft and under	46.00-47.00
Rails, 18 in. and under	47.00-48.00
Railroad specialties	47.50-48.00
Uncut Tires	46.00-46.50
Angles, Splice Bars	45.00-46.00

CLEVELAND

No. 1 Heavy Melt. Steel	$38.00-38.50
No. 2 Heavy Melt. Steel	38.00-38.50
No. 1 Busheling	38.00-38.50
Nos. 1 & 2 Bundles	38.00-38.50
Machine Shop Turnings	31.00-31.50
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings.	31.50-32.00
Cast Iron Borings	31.50-32.00
Bar Crops and Plate	41.00-41.50
Cast Steel	43.00-44.00
Punchings & Plate Scrap	41.00-41.50
Heavy Turnings	37.00-37.50
Alloy Free Turnings	33.00-33.50
Cut Structurals	41.00-41.50

Cast Iron Grades

No. 1 Cupola	43.50-44.00
Charging Box Cast	41.00
Stove Plate	41.00-41.50
Heavy Breakable Cast.	40.00
Unstripped Motor Blocks	40.00
Malleable	56.00-57.00
Brake Shoes	42.00
Clean Auto Cast	46.00
No. 1 Wheels	44.00
Burnt Cast	41.00-41.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	56.00-57.00
Rails, Rerolling	44.00
Rails, Random Lengths	44.00
Rails, 3 ft and under	48.00
Railroad Specialties	46.00
Uncut Tires	43.00
Angles, Splice Bars	48.00

VALLEY

No. 1 Heavy Melt. Steel	$39.00-41.00
No. 2 Heavy Melt. Steel	38.00-40.00
No. 1 Bundles	38.00-40.00
Machine Shop Turnings	34.00-35.00
Short Shovel Turnings.	34.00-35.00
Cast Iron Borings	34.00-35.00
Low Phos.	44.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00-43.00

MANSFIELD

No. 1 Heavy Melt. Steel	$40.00
Machine Shop Turnings	35.00
Short Shovel Turnings.	36.00-37.00

CINCINNATI

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
No. 1 Bundles	37.00
No. 2 Bundles	37.00
Machine Shop Turnings	31.00
Mixed Borings, Turnings	30.00
Short Shovel Turnings.	33.00
Cast Iron Borings	32.00

Cast Iron Grades

No. 1 Cupola Cast	47.00
Charging Box Cast	41.00
Heavy Breakable Cast.	40.00
Stove Plate	38.00
Unstripped Motor Blocks	38.00
Brake Shoes	35.00
Clean Auto Cast	46.00
Drop Broken Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt	40.00
R.R. Malleable	57.00
Rails, Rerolling	46.00
Rails, Random Lengths	44.00
Rails, 18 in. and under	50.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings	27.50-28.00
Mixed Borings, Turnings	27.50-28.00
Short Shovel Turnings.	28.50-29.00
Cast Iron Borings	28.50-29.00
Punchings & Plate Scrap	39.50-40.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-40.00
Heavy Breakable Cast.	33.00-34.00
Clean Auto Cast	39.00-40.00

BUFFALO

No. 1 Heavy Melt. Steel	$39.00-40.00
No. 2 Heavy Melt. Steel	37.00-38.00
No. 1 Busheling	37.00-38.00
No. 1 & 2 Bundles	37.00-38.00
Machine Shop Turnings	29.50-30.50
Mixed Borings, Turnings	29.50-30.50
Cast Iron Borings	29.50-30.50
Short Shovel Turnings.	30.50-31.50
Low phos	40.50-41.50
Elec. Furnace Bundles.	39.50-40.50

Cast Iron Grades

No. 1 Cupola Cast	40.00-41.00
Heavy Breakable Cast.	35.00-36.00
Malleable	48.00-50.00
No. 1 Wheels	41.00-42.00

Railroad Scrap

Rails, 3 ft and under	45.00-46.00
Railroad Specialties	46.00-47.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$36.50-37.00
No. 2 Heavy Melt. Steel	36.50-37.00
No. 1 Busheling	36.50-37.00
No. 1 Bundles	36.50-37.00
No. 2 Bundles	36.50-37.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings	29.50
Mixed Borings, Turnings	29.50
Short Shovel Turnings.	30.00-31.00
Bar Crops and Plate	41.50-42.00
Punchings & Plate Scrap	41.50-42.00
Cut Structurals	41.50-42.00
Elec. Furnace Bundles.	40.50-41.00
Heavy Turnings	39.00-40.00
No. 1 Chemical Borings	35.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	46.00-48.00
Charging Box Cast	45.00-46.00
Heavy Breakable Cast.	45.00-46.00
Unstripped Motor Blocks	40.50-41.50
Malleable	57.00-58.00
Clean Auto Cast	46.00-47.00
No. 1 Wheels	46.50-47.50

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$32.00
No. 2 Heavy Melt. Steel	32.00
No. 1 Busheling	32.00
Nos. 1 & 2 Bundles	32.00
No. 3 Bundles	31.00
Machine Shop Turnings	25.00-25.50
Mixed Borings, Turnings	25.50-26.00
Short Shovel Turnings.	27.00
Punchings & Plate Scrap	34.00-35.00
Cut Structurals	34.00-35.00
Elec. Furnace Bundles.	33.00
No. 1 Chemical Borings	24.50-25.00

Cast Iron Grades

No. 1 Cupola Cast	39.00
Charging Box Cast	38.00-38.50
Heavy Breakable	38.00-38.50
Unstripped Motor Blocks	36.00-37.00
Malleable	54.00-55.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$29.50-30.50
No. 2 Heavy Melt. Steel	29.50-30.50
Nos. 1 & 2 Bundles	29.50-30.50
No. 1 Busheling	29.50-30.50
Machine Shop Turnings	24.00-25.00
Mixed Borings, Turnings	25.00-26.00
Short Shovel Turnings.	26.00-27.00
Bar Crops and Plate	32.00-33.00
Punchings & Plate Scrap	32.00-33.00
Chemical Borings	25.00-26.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-44.00
Charging Box Cast	38.00-39.00
Heavy Breakable Cast.	38.00-39.00
Stove Plate	35.00-36.00
Unstripped Motor Blocks	35.00-36.00
Clean Auto Cast	40.00-42.00

CHICAGO

No. 1 Heavy Melt. Steel	$38.50-39.00
No. 2 Heavy Melt. Steel	38.50-39.00
No. 1 & 2 Bundles	38.50-39.00
No. 3 Bundles	36.50-37.00
Machine Shop Turnings	33.50-34.00
Mixed Borings, Turnings	33.50-34.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	34.50-35.00
Bar Crops and Plate	41.00-41.50
Cast Steel	41.00-41.50
Punchings	41.00-41.50
Elec. Furnace Bundles.	39.50-40.00
Heavy Turnings	38.00-38.50
Cut Structurals	41.50-42.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-45.00
Malleable	42.00-45.00
Clean Auto Cast	42.00-45.00
No. 1 Wheels	42.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-40.50
Rails, Rerolling	46.00-46.50
Rails, Random Lengths	41.50-42.00
Rails, 3 ft. and under.	44.00-44.50
Rails, 18 in. and under	44.50-45.00
Railroad Specialties	43.00-43.50
Angles, Splice Bars	43.00-43.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.50-40.50
No. 2 Heavy Melt. Steel	38.50-39.50
Machine Shop Turnings	32.00-33.00
Short Shovel Turnings.	34.00-35.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	42.00-43.00
Charging Box Cast	39.00-40.00
Heavy Breakable Cast.	35.00-36.00
Brake Shoes	37.00-38.00
Clean Auto Cast	42.00-43.00
Burnt Cast	35.00-37.00

Railroad Scrap

R.R. Malleable	54.00-55.00
Rails, Rerolling	45.00-46.00
Rails, Random Lengths	42.00-43.00
Rails, 3 ft and under	45.00-46.00
Uncut Tires	43.50-44.50
Angles, Splice Bars	43.00-44.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$34.00-35.00
No. 2 Heavy Melt. Steel	34.00-35.00
No. 1 Busheling	34.00-35.00
Nos. 1 & 2 Bundles	34.00-35.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	41.00
Stove Plate	39.00
No. 1 Wheels	36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.00
R.R. Malleable	42.50
Axles, Steel	39.00
Rails, Rerolling	41.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars.	41.00

SAN FRANCISCO

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Nos. 1 & 2 Bundles	22.00
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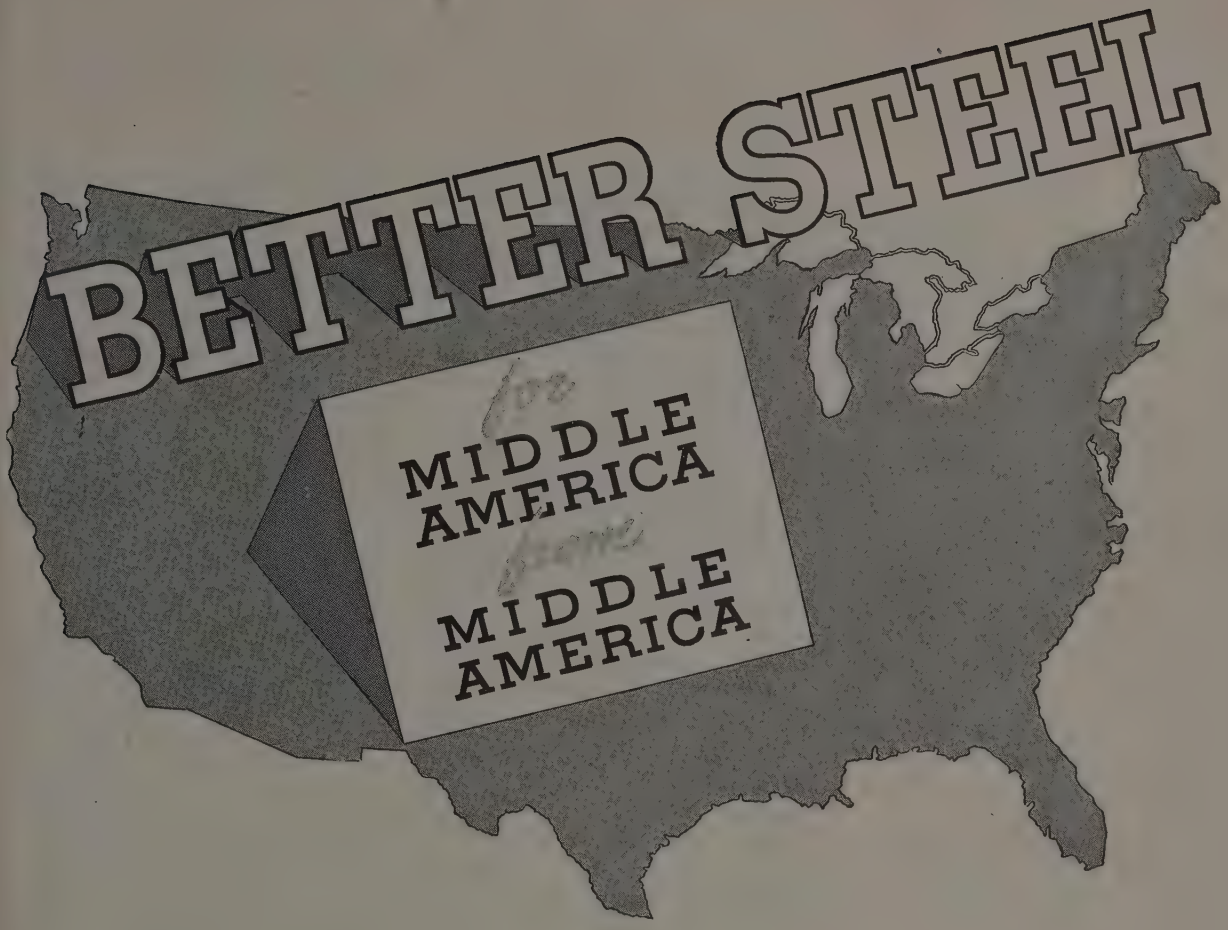

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Sheets, Strip . . .

Sharon and J & L issue new extra cards which confrom generally with Carnegie's

Sheet Prices, Page 122

Pittsburgh — Sharon Steel Corp. has issued a new extra card on hot-rolled strip incorporating simplification of packaging extras, which involved some increases and some reductions but with no significant changes from the standpoint of costs to customers. The packaging extras for both hot and cold rolled strip have been combined into the same schedule. Other revisions under consideration by strip producers are in the list of coiled weight extras on cold-rolled strips in pickling extras.

Jones & Laughlin Steel Corp.'s newest extra card for hot-rolled carbon sheets, superseding the list of May 17, 1947, and dated Aug. 20, generally conforms with the changes in extras which were made by Carnegie-Illinois Steel Corp. earlier last month (STEEL, Aug. 18 p. 60) Carnegie-Illinois' card, however, includes few extras which J & L does not list, one being a processing extra of 15 cents for extra smooth.

Stainless steel producers report definite decline in new orders, similar to that already experienced in cold-finished and alloy steel items. Most stainless steel sellers are actively seeking new business in what is developing into a highly competitive market. The price structure remains firm, however, with no reduction in base prices or waiving of certain extras reported. Some sellers can promise October delivery on most stainless items, with exception of cold-rolled strips. Recent decline in stainless orders is considered temporary and is attributed to overbuying last spring.

Although the sheet tonnage lost at Carnegie's Irvin Works during the recent wildcat railroad strike was considerably less than for other steel products in the company's plants in this district, it nevertheless accentuates already large carryover tonnage which must be made up by reducing customers monthly quotas in the months ahead.

Boston—Use of aluminum sheets as substitutes for No. 12 and 14 gage hot-rolled carbon steel sheets in fabricating 275-gal household fuel tanks by state of Massachusetts is likely to be adopted by other New England states. Tanks account for a sizable tonnage in this district. Various substitutions have been made, and now aluminum sheet orders are being placed. Aluminum tanks will sell for approximately $55 each. Shortages prevail in other grades of steel sheets, only the supply of stainless being in balance with demand. Shipments on third quarter allocations are behind schedule, and with some producers reducing fourth-quarter quotas there are indications of substantial carryover of orders into next year. Not since reconversion have narrow cold strip mills been so short of hot-rolled strip. This is preventing inroads on backlogs to the extent expected.

New York — Hot and cold rolled sheets continue particularly tight with some producers reporting their arrearages as heavy as at any time since the end of the war. This also is true with respect to galvanized sheets and enameling stock. Only in silicon and stainless steel sheets is there less pressure generally. There is still strong demand for silicon sheets, but supply is in somewhat better balance, with a result that customers of at least some mills are able to keep fairly abreast with their needs. Demand for stainless sheets and strip has been somewhat improved over the past month, but there is still more than enough tonnage to meet requirements.

Philadelphia — Sheet consumers look for a fairly steady flow of tonnage over the remainder of the year, although they are having to become reconciled to the fact that in the last quarter at least a third and probably more of what they will receive will be against current quarter allotments, also that it will not be nearly enough to meet their requirements. Some, as a matter of fact, are being confronted with a reduction in the quotas that were originally set up for the final quarter because of the recent wildcat railroad strike in the Pittsburgh area. Stainless continues in easy supply, and some betterment is reported in the silicon sheet situation.

Chicago — Despite maintenance of steelmaking rate of well over 90 per cent of capacity, sheet and strip makers report no progress in catching up with swollen backlogs. Consumers in every field of activity are pressing for faster deliveries and larger quotas, complaining that unless steel is obtained their fabricating schedules will be disrupted. All steel producers are utilizing their assigned quotas of steel ingots so that it is not possible to divert unused tonnages to increase output of flat-rolled products. The tightness gives emphasis to the gray market, encouraging consumers to acquire needed tonnage from any source offering it.

Cincinnati — Sheet mills in the district are none too confident that home building needs will show a seasonable shrinkage to an extent where it would be reflected in release of tonnage for other consumers. It is unlikely, in face of the tight market, that the cutback would be voluntary. Mills say pressure for deliveries is as severe as during the war. Production is holding at a high level.

Birmingham — Shortage of sheets continues unabated and processors are hard pressed for supplies, a situation to which they have become accustomed and, as a matter of necessity, adjusted.

St. Louis — Granite City Steel's finished steel production dropped 12,000 tons last week when the slab mill broke down due to long lack of repairs. The strip mill will also be out of operation this week for repairs. Ingots are being piled but it will be difficult to regain the lost tonnage until a new cold rolling mill now under construction is completed, probably by Nov. 1. Demand for strip has been exceptionally heavy, and pressure for sheets remains unchanged at a high level. Books for 1948, which have been closed all year, are scheduled to reopen for limited tonnage next month, providing repairs do not prevent wiping out last year's carryover as planned. Plate demand continues in excess of local capacity but there is some easing in pressure.

Steel Bars . . .

Bar Prices, Page 122

New York — While there has been an easing in cold-drawn carbon bar demand, this has not yet been reflected in any important degree in the supply of hot-rolled carbon bars. This may be ascribed in certain cases to the fact that the allotment of steel for carbon bars is limited, except when it is for further processing by the producer into cold-drawn stock which represents better profit. Continued easing in cold-drawn bar demand should have a softening effect on hot bars eventually. Meanwhile, demand for small sizes of hot bars seems to be beyond the ability of producers to meet; one leading producer claims that he is now behind on commitments for large rounds as well as the small rounds and flats. This is in contrast with the situation a few months ago when the large specifications lagged behind all others. Hot and cold alloy bar demand remains sluggish, with deliveries available in four to five weeks.

Boston—Indications now point to most producers being caught up by the first of 1948 on hot-rolled carbon bar schedules, flats and bar shapes excepted. Cold finishing units have about reached this point, thus releasing some hot-rolled tonnage to other consumers. Inventories of bar users, including forge shops and warehouses, are improved, and new buying is increasingly conservative. Forged tool pipelines are filling, and new volume of orders, including demand for files, is lower.

Pittsburgh — Substantial easing in carbon bar requirements for cold finishers, and definite easing in demand for alloy bars, both of which are produced in open hearths, has enabled some carbon bar producers to reduce order backlogs. At least one producer is in position to ship some alloy bar sizes within ten days. Demand for alloy spring steel flats is holding up fairly well. Delivery pressure for carbon bars, even small sizes, has been showing signs of easing. However, in the case of Carnegie-Illinois this situation has been offset by recent loss of substantial tonnage at its Pittsburgh plants due to the railroad strike. By close of last week, however, the company's bar mills had resumed near-normal operation.

Philadelphia—Hot carbon bar consumers report continued difficulty in getting small rounds and flats. The situation is somewhat better in the medium sizes although supply is short of requirements. Large specifications in general are in easiest supply of all; however there has been some tightening over recent months and at least one large producer is behind on deliveries of the large as well as the small although able to keep fairly abreast of the medium sizes.

Cold drawn carbon bars are fairly easy, with producers accepting tonnage in some cases for shipment throughout the entire first half of next year in an effort to bolster order backlogs for this material. Producers are also willing to accept orders on alloy bars well into the future, although consumers generally, appreciating the exceedingly easy market in alloy steel, are disposed to cover only the nearby requirements. With few exceptions they can obtain deliveries within four to six weeks.

Chicago — All carbon bars are now in heavy demand, the larger sizes which until recently showed some easiness now having moved into tightness almost equal to that prevailing for the smaller sizes. Alloys and cold-finished grades however, continue easily available as they have for some time. Manufacturing plants in all fields are operating at high levels and are clamoring for more bar shipments to maintain their schedule. Mill backlogs are showing no signs of diminishing and the carryover at yearend is going to be substantial.

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Plates . . .

Plate Prices, Page 123

Boston—Builders of small tanks are generally unsuccessful in placing additional tonnage, and the stringency in one-quarter and three-sixteenths inch plates is severe. The limited number of producers accepting orders for carbon plates in these sizes are overloaded with tonnage and deliveries are more extended. Selectivity in order acceptance continues to be a factor in distribution of material. Some are taking only high tensile and extra-carrying orders, and the result is an upgrading of considerable plate fabricated work. However, additional costs are not always reflected in fabricators' prices. Allocations for fourth quarter are on the whole no heavier and some have been reduced through blank-outs and schedule revisions by as much as 20 per cent.

New York — While production in the Pittsburgh area is stepping up again, following the wildcat rail strike, plate consumers here are having continued difficulty placing new orders and some of them will experience further delay in obtaining tonnage under contract because of the strike. All producers are behind in one degree or another on current commitments and all are well booked up over the remainder of the year. New orders for plates cannot be placed before next year as a general rule, and it is not too easy for consumers to do that, especially as some leading sellers have not opened their books.

Pittsburgh — Plate production schedules were hardest hit of any steel items that were affected by the recent wildcat railroad strike at Carnegie-Illinois' plants here. Plate tonnage loss exceeded 40,000 tons and is expected to have a retarding effect on such key programs as freight car construction and pipe line installation. Sellers state the plate supply situation in relation to demand closely approaches that of sheets. Demand has held up remarkably well since termination of the war and there is no indication of any easing in present order volume. Bulk of shipments continues to be channeled to freight car builders and fabricators of storage tanks, heavy machinery, barges and large diameter pipe. Trend toward greater use of welded rolled plates to replace castings (accentuated by inability to obtain castings due to pig iron and cast scrap shortage) is an important factor in augmenting the present plate demand.

Philadelphia — Despite the fact the season for installing underground fuel oil tanks is nearing an end in the North, demand is still heavy, thus contributing to continued pressure for light gage plates. Most, if not all, producers are unable to accept further tonnage for delivery this year and where they are taking orders for this lighter gage plate, sellers are usually tying them in with a certain percentage of the heavier gage tonnage as well.

Birmingham — Plate production maintains a high level in the southern district and currently approximates capacity, but overall needs, while varying somewhat in favor of lighter gages, more than keeps abreast of production. The fact that Republic Steel Corp. will use considerable plate tonnage in its new tube mill does not make plate users generally any happier in this section. Deliveries already extend into next year.

Seattle — Plates continue scarce and plant managements hesitate to commit themselves beyond available supplies. Shops generally are busy, tank and boiler jobs predominating. Bids will be called soon by the U. S. Engineer, Portland, Oreg., for a coffer dam at McNary dam site, Columbia river, involving an unstated tonnage. Everett Pacific Shipbuilding & Drydock Co., Everett, Wash., has a contract at $331,311 for reconversion of the steamer *Patuxent* to a commercial tanker, the vessel having been bought by Sabine Transportation Co., Port Arthur, Tex. The job involves unstated tonnages of plates and shapes.

Wire . . .

Wire Prices, Page 123

Birmingham—Wire products are chronically scarce in all categories. Flow to the retail trade is a mere trickle as compared to needs, with the result jobbers are doling out their allocations on the most equitable basis possible and of course, with regard to regular customers. Baling wire, manufacturers wire, fencing and nails all remain on the critical list. Advent of colder weather will, however, bring relief in agricultural demand.

Tin Plate . . .

Tin Plate Prices, Page 123

Pittsburgh — Tin plate output at Irvin Works of Carnegie-Illinois Steel Corp. was fairly well sustained despite the weeklong tie-up of inter-plant shipments by wildcat strike of Union Railroad employees. However, because inventory of slabs was nearly depleted an adverse effect on production schedules can be expected later. Pressure for prompt tin plate deliveries remains unabated, with demand for general line cans more than sufficient to take up indicated lag in requirements for food pack program next quarter. Indicative of the expanding tin plate requirements for beer cans, for example is recent announcement by American Can Co. that it has bought a 46-acre site in Hillside, N. J., for a factory to make these cans. Company also has started construction on a $1.5 million plant at Indianapolis for motor oil and other type containers. No change in volume of export tin plate requirements is noted, with current quarter directive tonnage less than half of stated needs. Some increase in tin plate export directive tonnage may occur for first quarter, although this matter will not be decided until the industry advisory committee meets in October.

Tubular Goods . . .

Tubular Goods Prices, Page 123

Pittsburgh — Cast iron pipe producers have not been able to make much headway against very extended backlogs in recent weeks, due primarily to pig iron shortage. In size ranges 4 to 12-in. deliveries are extended 15 to 18 months, while for larger sizes backlogs range between 6 to 8 months. Some cast pipe interests are quoting on basis of present pig iron prices with an escalator clause to the effect that price at time of shipment will go up to extent of the advance, if any in pig iron in the interim. Due to extended deliveries within the industry considerable tonnage involved in new projects has been indefinitely postponed, and other projects have been seriously delayed. Production of carbon and alloy tubing has been well sustained at practical capacity to date this month. Producers have been able to reduce order backlogs slightly, reflecting moderate easing in new order volume as customers' inventory pipe lines become filled. Industry's production capacity is held adequate to meet estimated requirements in months ahead, particularly for alloy and stainless tubing.

New York — Some leading producers of merchant pipe are now setting up allotments for next year, at least on a tentative basis, with indications that the distribution will be at about the same level as this year. In some instances final allocations will be made on a quarterly basis, although in most cases they will be on a monthly basis. Increasing building construction is adding pressure for pipe, but distributors, unable to build up inventories and with mill allotments virtually unchanged, can do little toward meeting this additional demand. Once winter sets in, however, there should be some relief in this direction. Line pipe requirements continue heavy, with one large producer booked well into 1951. Certain other sellers are refusing to take business that far ahead, but are nevertheless sold up solidly for many months in the future.

Seattle — Cast iron pipe demand continues heavy, but delayed and indefinite deliveries are holding back awards. Seattle has opened bids for 550 tons, and bids were recently opened for a sizable tonnage at Richland for the Hanford Engineering project. It is reported this was placed with steel pipe interests because of delayed cast iron deliveries.

Structural Shapes . . .

Structural Shape Prices, Page 123

Philadelphia—Structural demand continues fairly active, with prospects for a better last half than in 1946. Meanwhile, fabricators have substantial order backlogs, some booked up solidly for at least six months. Local orders are light, but a good volume of tonnage is actively pending. Largest recent award involves 570 tons of shapes and 160 tons of joists for the Seaboard Container Corp., Bristol, Pa., placed with Bethlehem Steel Co., Bethlehem, Pa. Recent inquiry includes several state bridge jobs and 190 tons for bridge alterations for the Reading Railroad.

Boston—Improvement in availability of structurals depends on extent of shipments to car building shops and exports. If these two classifications continue to absorb tonnage at their current rates, improvement is doubtful. Meanwhile, supply sources have dwindled to two. At least three producers have withdrawn from the structural field, although one still produces sections five inches and under. Demand for fabricated structural tonnage is spotty, but, considering high building costs, is substantial.

New York — Structural demand continues more active, with more work being figured than earlier in the summer. Seasonal influences may retard this trend later in the year, but it is generally believed that building construction will reach a postwar peak by next spring.

Chicago — Structural steel fabricators are being pressed constantly to take on more work, but are obliged to proceed cautiously in keeping within their quotas of plain shapes from mills. Backlogs of work for fabrication are extended, running as much as six to eight months, and it is useless to book orders that cannot

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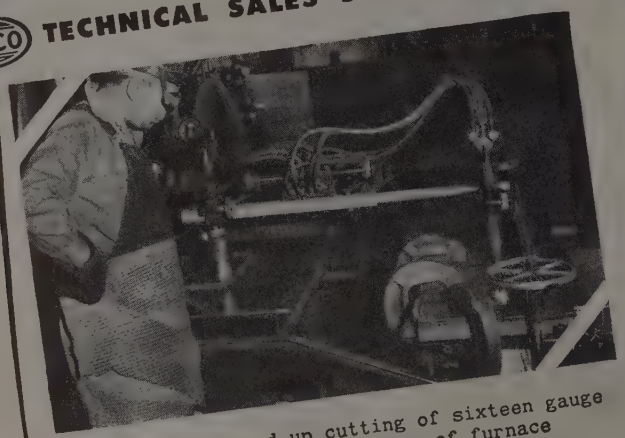

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be delivered when needed. New inquiry for structural steel continues at a light level, and awards have fallen off considerably.

Birmingham — Shape production is steady, although below capacity. Shapes generally are still described as somewhat spotty with most tonnage consisting of relatively small projects. Larger construction, however, is in the offing, probably for next spring if building conditons clear up generally.

Seattle — Shape fabricating plants have a fair amount of work, but operations are still hampered by low mill allocations and delayed deliveries. Interest centers in the opening of bids Oct. 15 for the Narrows Bridge near Tacoma, involving 14,241 tons of shapes, 4732 tons of wire cable and 848 tons of reinforcing. Pacific Car & Foundry Co., this city, will furnish 60 tons for the east power house, Coulee dam.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 122

Seattle — Rolling mill operations continue at peak levels, first consideration being to reduce order backlogs. Meanwhile a large volume of small contracts involving 20 to 50 tons each, is being booked, largely for public works and industrial constructon. Many large projects have been sent back for reconsideration and revised plans to reduce costs. Typical is the University of Washington medical-dental unit involving 1350 tons, with new bids asked for Sept. 23. A hospital job at Selah, Wash., involving 430 tons, will be readvertised shortly. Northwest Steel Rolling Mills, this city, has taken 400 tons for a hospital at Missoula, Mont. W. G. Clark, this city, is low at $445,300 for proposed state patrol and testing station here, involving an unstated tonnage. Plans are in preparation for a state concrete bridge at Renton, Wash., estimated at $100,000. Other reinforcing tonnages will be required for several industrial plants in the Seattle and Portland areas.

Pig Iron . . .

Supply problems aggravated by suspension of operations of a Swedeland, Pa., furnace

Pig Iron Prices, Page 124

Philadelphia — Pig iron supply here has been made more difficult by the suspension of operations at the larger of the two blast furnaces at Swedeland, Pa. This furnace, with a daily capacity of around 600 to 700 tons, has been blown out for relining and other major repairs. The company has advised customers that the stack will be in operation by not later than Dec. 1, although it is hoped it can be brought in before that. Much depends upon what will be required in the way of repairs. The furnace has been in operation since May 1941. It was scheduled to have been blown out early this year but because of the critical shortage of iron was kept going until finally it became imperative to close down.

The smaller of the two stacks at Swedeland, with a capacity of 400 to 500 tons daily, will be devoted entirely, it is understood, to the supply of hot metal to its affiliated steel plant at Conshohocken while the larger unit is down. This leaves a serious gap in the supply in this district which will be felt by some steel producers as well as a number of

foundries. Some foundries, in fact may have to suspend operations for at least limited periods unless adequate supplies can be developed elsewhere, which at the moment does not appear too likely. However, suspension of the larger furnace at Swedeland will ease the situation in oven foundry coke, and with a freer movement of this material, combined with greater consumption of scrap, plus greater use of alloying elements, various foundries might be able to carry on in a measure better than now anticipated.

Pittsburgh — Carnegie-Illinois Steel Corp. had blown in the 18 blast furnaces, banked because of Union Railroad strike, by mid-week. Most foundry interests continue to operate well below capacity due to the critical pig iron shortage, at least two foundries being forced to close down temporarily last week because of this shortage. Many foundries have increased proportion of cast scrap in their melting operations to maintain production above 70 per cent of capacity. Very little iron is shipped here from merchant stacks in other districts, an important factor in current supply shortage. Pittsburgh Coke & Chemical Co. continues to allocate its monthly output on a very restricted basis, with customers obtaining substantially less than stated needs. Merchant pig iron production is expected to remain well below essential requirements of most foundries well into 1948, while poor coke quality likely will continue to restrict pig iron output among integrated steel producers.

New York — With one blast furnace just down in Swedeland, Pa., and another at Buffalo, the movement of pig iron into this district this month should be substantially lighter than in August. The furnace at Swedeland is reported down for relining and the one at Buffalo because of lack of coke. Barring periods of major strikes in the steel and coal industries, pig iron consumers here declare that they have never experienced such a stringency of supply. Some indicate that they will have to suspend operations temporarily before the month is over.

Boston—Additional tonnage of pig iron is not in sight for fourth quarter, and if any extra tonnage is to be available it must come from Buffalo or other outside furnaces. More iron for the merchant trade is unlikely as long as the steel production rate remains at current high levels. Pressure for tonnage, however, is not as strong, and in spots, gray iron order backlogs are smaller, with some foundries looking for orders. Contributing to the heavy demand and consumption of iron are increases in foundry capacity. Some in the textile equipment field have nearly doubled melt capacity since reconversion.

Chicago — Pig iron production in this district has reached what likely is an all-time high, with 40 of 42 blast furnaces operating. Not since February and March, 1945, have as many as 40 stacks been blowing. A new tonnage record seems assured by the fact two of the furnaces are of very large capacity and were not operated during the war. Within a week, Inland Steel Co. will be relighting a repaired stack to push iron output still higher. High level ironmaking not only assures a higher steelmaking level but will provide more merchant iron for iron-starved foundries. Demand for iron continues as strong as ever, requiring sellers to distribute inadequate supplies with care. Breakdown of a Geneva, Utah, blast furnace a few days

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ago has had the effect of transferring some West Coast demand for iron to this district.

Cleveland — Relining of one of the furnaces of a leading pig iron producer was completed last week and the furnace blown in last Thursday, bringing the number in blast in the district up to maximum.

The district interest which bases its pig iron prices on published quotations for steelmaking scrap last week continued to bill iron shipments at unchanged prices from the previous two weeks. These quotations are $38.25 for basic, $38.75 for No. 2 foundry and $39.25 for malleable. Other area producers' prices are unchanged at $35.50, $36 and $36.50, respectively.

Buffalo — The tight pig iron situation took a turn for the worse recently when one of the leading merchant producers had to bank a blast furnace because of a temporary shortage of coke. The stack was expected to resume production this week if enough fuel could be accumulated to assure continuous operation. Trade interests reported September has been the tightest month for pig iron so far this year and the recurring rail car shortage has added to the headaches of both producers and melters.

One producer in the area, who bases its prices on published quotations for No. 1 heavy melting steel scrap, is billing basic at $37.50, No. 2 foundry at $38 and malleable at $38.50.

Cincinnati — District foundries continue the practice, whenever feasible, of using larger proportions of scrap in the melt, as the supplies of pig iron show no improvement. Furnaces, both northern and southern, are moving iron steadily against allotments, but these are below the tonnage provided in this district earlier in the year. Coke tends to be easier, one reason being inability of foundries to expand operations.

Birmingham — Pig iron production remains at virtual capacity with the exception of one regular furnace on ferromanganese. Capacity production, however, has long since ceased to be sufficient to meet the territory's needs. Some estimates of an additional 50,000 tons a month requirements are being revised upward. Most of the plants dependent on pig iron in the district continue to operate considerably below capacity.

Keokuk, Ia.—Keokuk Electro-Metals Co. has advanced electric furnace silvery piglets $4 a ton to $78, and open-hearth and foundry grade pigs by the same amount to $76, Keokuk. New prices were effective Sept. 4.

St. Louis — Pig iron production in this district has continued uninterrupted at capacity for several months, one of Koppers' two 500-ton blast furnaces being devoted to basic and the other to foundry. Most local consumers are in fair position. Uncertainty over impending sale of the Koppers furnaces here is alarming local steelmakers who fear transfer of the property to such outside interests as Kaiser, Ford, Colorado Fuel & Iron or Sharon Steel—all of whom are expected to bid—would possibly divert output to other districts.

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Scrap . . .

Scrap Prices, Page 128

Pittsburgh — Relatively little activity pricewise occurred last week, with heavy melting steel remaining unchanged at $38 for the third consecutive week, No. 1 cupola steady at $43 to $43.50 and railroad heavy melting the same at $42 to $42.50. Rails were stronger however, on the basis of recent Pennsylvania Railroad awards. Persistent shortage of good quality scrap has led some market observers to doubt that prices will decline much further in the near future, although this opinion is by no means unanimously held. There are indications that Army and Navy battlefield scrap collection and segregation efforts are becoming better organized and should be a helpful factor in the months ahead. An important source of domestic scrap, estimated to represent over 1 million tons, is that held by War Assets Administration in the form of shell, pontoons and other war materiel. Scrap is moving more freely than a few weeks ago, making possible slight increases in mill inventories. However, the major problem is to maintain this collection and preparation pace through the winter. Leading consumers contend present price levels are adequate to encourage intensive collection efforts and argue that higher prices would not bring out much additional tonnage.

Philadelphia—The situation in the major grades of steel scrap here continues at somewhat of a stand-off. Larger consumers still look for an additional decline in melting steel of possibly a dollar or so but sellers so far have been able to resist further price inroads, with little trading developing as a result. Sellers generally anticipate a stronger market and point out that while stocks at some consumers' plants are in fairly good shape, admittedly

far better than a year ago at this time, the general average inventory is far from satisfactory, especially with the winter season coming on. Further, they point to the acute situation in pig iron, with the supply here made even more critical by the recent withdrawal of the larger of the two Swedeland, Pa., blast furnaces for major repairs. The furnace will likely be down for at least several weeks. Also indicating strength is the fact, so sellers declare, that there have been no important cancellations of scrap overdue on old orders placed at the higher levels earlier in the summer. On the other hand some consumers report a fairly good flow of material and the leading eastern consumer continues to hold up shipments at Steelton, Pa.

Some increases are noted in turnings, low phos scrap and in certain of the leading grades of cast scrap. Machine shop turnings and mixed borings and turnings are now holding at a flat level of $29.50 delivered, short shovel turnings at $30 to $31, bar crops and plate, punchings and plate scrap and cut structurals at $41.50 to $42, and electric furnace bundles at $40.50 to $41. No. 1 cupola cast has advanced to $46 to $48 delivered, heavy breakable cast to $45 to $46 and unstripped motor blocks to $40.50 to $41.50.

New York — Steel scrap buying is quiet, with consumers and sellers unable to get together on prices. Consumers apparently look for further concessions, whereas sellers believe conditions do not warrant a decline. As a result of this stalemate, melting steel prices have been relatively unchanged for the past three weeks or so. This steadiness is reflected in brokers' buying prices, with leading interests still offering $32 fob shipping point for melting steel, No. 1 busheling and No. 1 and No. 2 bundles. They also are offering to buy borings and turnings and low phos scrap at unchanged figures. On No. 1 cupola cast, however, they are now paying higher at around $39 and have also boosted their prices on charging box cast and heavy breakable to $38 to $38.50 and on unstripped motor blocks to $36 to $37.

Buffalo — Quiet strength pervaded the scrap market as dealers reported fresh buying interest at the quoted range of $39 to $40 for No. 1 heavy melting and $37 to $38 for other steelmaking grades. With a shrinkage noted in recent yard receipts, dealers are hesitant about accepting additional orders. Mills report stockpiles have been augmented by dealers covering old orders. The mill which recently lifted a stop-order on shipments will not place any new business for the rest of the current month.

Dealers holding No. 1 heavy melting orders report difficulty in efforts to find sufficient top quality scrap to cover commitments. Cast scrap is again moving into Canada from local sources.

A late flurry is reported in water arrivals of scrap. Ten barges carrying 5,800 tons, which were loaded in New York, arrived last week while further shipments are due from the Duluth area before the current navigation season closes.

Chicago — For another week the scrap market here has remained unchanged with prices nominal; open-hearth grades being listed at $39, delivered consumer. As a result of only light mill buying, the market still awaits a test. Brokers and dealers are still busy filling old orders booked at high prices and this flow is adequate for immediate consuming needs. It is apparent that steelmakers are refraining

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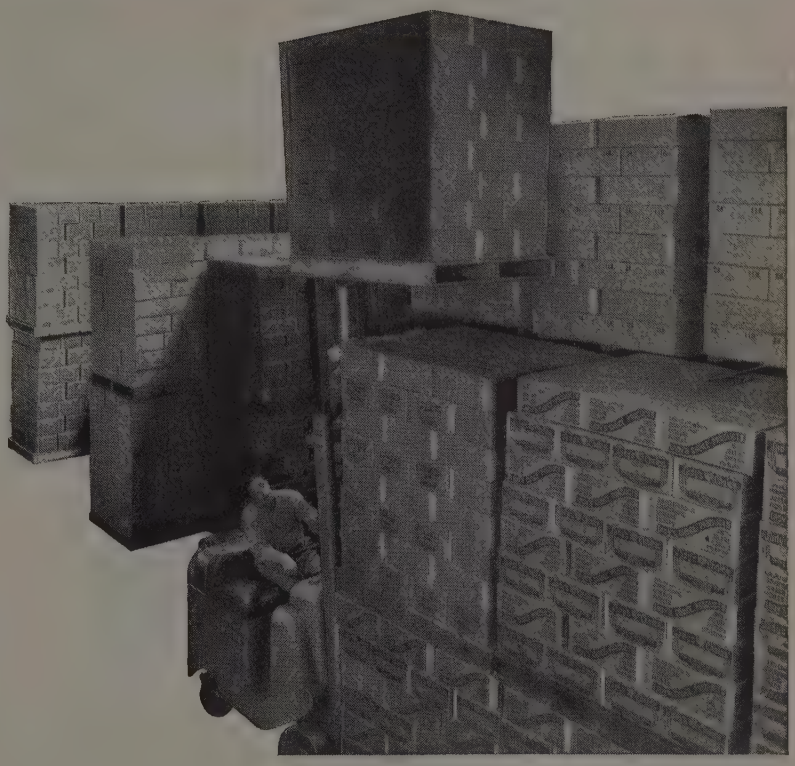

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from volume buying lest prices react upward. Another factor which makes new buying less urgent is that hot metal production currently is close to, if not at, an all-time high. For the first time since March, 1945, active blast furnaces number 40, this including two large-capacity stacks not operated during the war; thus steel mills are in a position to use more hot metal in furnace charges.

Cleveland — Quietness permeates the local scrap market, the only consequential movement being against old $40 contracts. All other higher priced contracts in the district have now expired. Scrap is still short in all categories and notably so in foundry grades. This shortage lends much credence to trade reports of a strong undertone to the market, and some brokers and dealers are looking for an upward turn in prices next month. Counteracting this pressure are the concerted efforts of steel producers to beat scrap prices down. Prices remained generally unchanged last week, the one exception being No. 1 heavy melting in the Valley which was quoted at $39 to $41, or $1 higher than other steelmaking grades. No such differential exists locally, however.

Detroit — Holiday observed last Monday by most dealers and brokers brought a brief interruption to normal scrap trading. The local mill has extended period for shipments on old orders to the end of the month, instead of the 15th and has signified intention to pay the current market price on "free" tonnage, despite the $3 per ton reduction on channeled scrap. Electric furnace plate scrap is slightly stronger on the basis of sales to a local melter, and is marked up 50 cents to $39.50-$40.00. Price on turnings is nominal, since much of this material is being crushed and baled for sale as bundles.

Cincinnati — Mixed trends are noted in the iron and steel scrap market. Prices are unchanged but none too stable. The recent withholding of orders which brought a sag in prices has about reached the end of its effectiveness. Mills are becoming more and more interested in tonnage to bolster winter reserves, while brokers and dealers contend that the visible supply is short in comparison with needs at the current high level of steelmaking.

Birmingham — The district's scrap situation seems to have taken on a considerably greater semblance of order and has settled down to more or less of a routine. No changes in posted prices of scrap were made during the week, although sales at varying figures, some above quoted prices, are reported from time to time. Supply, at the moment, seems to be approximately adequate.

St. Louis — Scrap reserves at mills continue to gain ground moderately. The market is hesitant with shipments uncertain. Mills report deliveries on new orders are fair but have given up hope on the old, lower-price ones. Brokers, however, contend they are filling the latter as fast as possible. Major melters continue to show a disposition to hold out of the market when reserves permit, attempting to get prices "off the fence" on the downward side. Predictions nevertheless are for a firm level the next few weeks. Improving weather in the area and the end of the crop season are expected to result in better shipments soon.

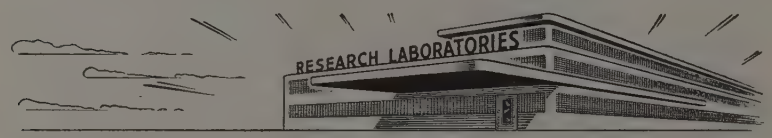
Seattle — Supply and consumption of steel scrap are reported about in balance. Inventories are not increasing. Release of surplus government vessels for breaking is augmenting supply. Between Aug. 1 and Oct. 1, thirty LSTs on Puget Sound will have been sold for this purpose, each unit to yield 700 to 800 tons which will materially ease the local situation. Dealers are expecting larger shipments from the country areas following crop harvesting.

Warehouse . . .

Warehouse Prices, Page 125

Pittsburgh — Steel distributors' inventories of plates, wide flange beams and light structural angles, carbon bars under 2-in., most carbon tubular and wire items, and sheets and strip remain well below customers' requirements. For those interests dependent on Carnegie-Illinois Steel Corp.'s plants here for bulk of tonnage, this supply problem is expected to be accentuated next quarter due to probable reduction in monthly quota allotments resulting from the production loss recently sustained. However, warehouse steel stock in such items as cold-finished carbon bars and most alloy and stainless steel items are in excess of present requirements; a similar situation is noted for tool steels. Distributors continue heavy pressure for deliveries for most steel items and there is no indication of any easing in demand through remainder of this year. In many instances customers are unable to maintain capacity production schedules due to the inadequate supply situation for most steel items.

Philadelphia—While at least one leading jobber reports business so far this month is continuing on about the same



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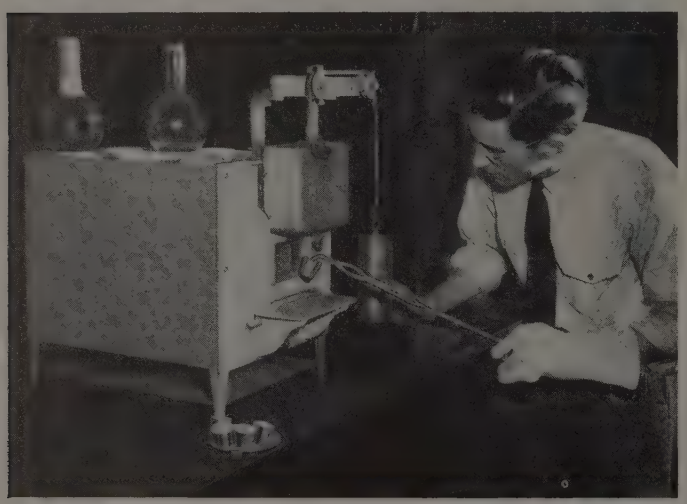

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level as for August, others report some decline, despite the fact September usually shows improvement. Tonnage is good, however, and the principal concern of distributors still is to get enough steel in the desired specifications to meet demand. Should the railroads be granted the 10 per cent emergency freight increase they are seeking, warehouse prices would immediately reflect it, jobbers say.

Chicago — Steel warehouses continue to operate with depleted stocks, which make serving customers difficult. Unable to obtain steel from mills in adequate quantities, consumers rely insofar as they can on warehouses to supply items necessary to keep operation schedules maintained. Principal demand is for the flat-rolled products, small carbon bars and light structurals, none of which can be found in warehouses in balanced stocks. Even the larger sizes of carbon bars are showing increased tightness, although alloys and cold-finished products are in more comfortable position.

Cincinnati — Pressure for deliveries of steel from jobbers seems to grow in intensity. Some of the most urgent calls are from fabricators trying to finish uncompleted products. Mill shipments to the district are unimproved, hence sales may be held to August tonnage, which was off from previous levels.

Iron Ore . . .

Iron Ore Prices, Page 124

Cleveland — Shipments of Lake Superior iron ore from upper lake ports for the week ended Sept. 15 totaled 2,602,975 gross tons, compared to 2,340,010 gross tons shipped in the comparable week last year. Cumulative shipments in the current season up to Sept. 15 were 56,285,047 gross tons which was 17,941,815 tons, or about 42 per cent, greater than the quantity shipped during the comparable period of 1946. Of the latest week's shipments, 2,539,609 gross tons were from the U. S. ports of Escanaba, Marquette, Ashland, Superior, Duluth and Two Harbors; the remaining 63,366 gross tons was shipped from Michipicoten and Port Arthur in Canada.

Rails, Cars . . .

Track Material Prices, Page 123

New York — Pennsylvania Railroad has closed on 141,000 tons of rail for 1948 delivery with 70,500 tons going to Carnegie-Illinois Steel Corp., Pittsburgh, 62,000 tons to Bethlehem Steel Co., Bethlehem, Pa., and 8500 tons to Inland Steel Co., Chicago. The rail will be of newly designed heavier sections, weighing respectively 133 pounds, 140 pounds and 155 pounds to the yard.

Rail demand is showing greater life in other directions also, with the Lackawanna inquiring for 12,000 tons and New York Central expected in the market shortly for a substantial tonnage.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 124

Pittsburgh—Coke production schedules at Clairton Works of Carnegie-Illinois Steel Corp. returned to normal early last week, following termination of the Union Railroad wildcat strike. Extremely tight coke supply is indicated by fact Carnegie continued to accept and divert coke shipments from other supply sources during strike period when blast furnace operations at plants in Pittsburgh district were at a standstill. Poor quality of much of coke produced today continues to present a major operating problem to blast furnace and foundry interests. If it were not for fact that many foundries are operating well below capacity due to critical pig iron shortage, a similar situation would develop in regard to coke upply. However, the coke oven expansion and rebuilding programs now under way are expected to improve general supply situation over coming months.

Canada . . .

Toronto, Ont. — Production of primary iron and steel shapes in Canada for June totaled 253,869 net tons, compared with 282,543 tons the previous month and 226,383 tons in June, 1946. Output included 244,117 tons of carbon steel shapes and 9752 tons of alloy shapes.

Shipments of primary iron and steel shapes in June amounted to 188,655 net tons, of which 179,709 tons was carbon and 8946 tons alloy, which compares with 191,562 tons of carbon steel shapes and 11,119 tons of alloy shapes shipped in May, and with 215,316 tons of carbon shapes and 5399 tons of alloy shapes shipped in June, 1946. Shipments for June included only those shapes made for sale and not the tonnage delivered under producers' interchange, which amounted to 70,478 tons.

For the six months ended June 30, production of primary iron and steel shapes totaled 1,621,207 net tons, and

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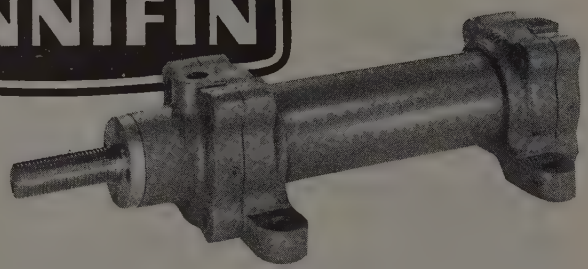

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shipments for sale amounted to 1,230,781 tons; deliveries for producers' interchange was 406,996 tons. For the corresponding period of last year production of primary iron and steel shapes totaled 1,451,707 net tons, shipments for sale 1,186,742 tons, and producers' interchange 274,530 tons.

June shipments of primary iron and steel shapes were: 5495 tons of semifinished shapes; 15,533 tons of structurals; 14,797 tons of plates; 16,004 tons of rails; 45,424 tons of hot rolled bars; 10,875 tons of pipes and tubes; 17,535 tons of wire rods; 19,942 tons of black sheets; 7481 tons of galvanized sheets; 513 tons of tool steel; 7491 tons of castings; and 27,564 tons of other shapes. The amount of producers' interchange was 70,478 tons in June and 74,813 tons in May.

Of the amount shipped for sale during June, 42,050 tons went direct to railways and railway car shops; 10,885 tons to pressing, forming and stamping plants; 18,482 tons to merchant trade products; 24,201 tons to building construction; 17,980 tons to the container industry; 8049 tons to agricultural equipment; 10,255 tons to the automotive industry; 12,864 tons to machinery plants; 3554 tons to shipbuilding; 6706 tons to mining, lumber, etc.; and 2058 tons to miscellaneous industries. Wholesalers and warehousing accounted for 27,129 tons and exports for 4442 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3600 tons, sheet piling, bulkhead wall, Brownsville, Tex., for Brownsville Navigation District, to Carnegie-Illinois Steel Corp., Pittsburgh.

900 tons, new plant, Sunbeam Corp., Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Olsen & Urbain, Chicago, architects.

570 tons and 160 tons of joists, for Seaboard Container Corp., Bristol, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

490 tons, Manhattan blower building in connection with Brooklyn-Battery tunnel, New York, through B-M-W Contracting Co., to Lehigh Structural Steel Co., Allentown, Pa.; this is in addition to 1400-ton ventilator building recently noted as placed in connection with this project with this fabricator.

450 tons, factory building, Federal Tool Corp., Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Campbell-Lowrie-Lautermilch Corp., contractor.

285 tons, addition to new garage for New York Daily News, New York, to Lehigh Structural Steel Co., Allentown, Pa., which earlier in the year received contract for original structure.

285 tons, plant building, Sloane-Blabon Corp., Philadelphia, to Lehigh Structural Steel Co., Allentown, Pa.; this is in addition to 200 tons recently noted as placed with this fabricator for the same project.

250 tons, plant, U. S. Rubber Reclaiming Co., Cheektowaga, N. Y.; to August Feine & Sons Co., Buffalo; Carpenter & Skaer Inc., general contractor.

180 tons, factory addition, Cleveland Graphite Bronze Co., Ft. Wayne, Ind., to Mississippi Valley Structural Steel Co., Decatur, Ill.; Wermuth Inc., Ft. Wayne, Ind., contractor.

150 tons, warehouse and office building, Holorie Realty Co., Long Island City, N. Y., to American Bridge Co.

150 tons, trolley coach depot, New York, to Schacht Steel Construction Inc., New York.

140 tons, mechanical building, Johns-Manville Co., Manville, N. J., to Harris Structural Steel Co., New York.

130 tons, building, Rensselaer, N. Y., to James McKinney, Albany, N. Y.

110 tons, addition, Cleveland Hill School, Cheektowaga, N. Y. to R. S. McMannus

Steel Construction Co. Inc., Buffalo; L. A. Monroe Co. Inc., Buffalo, general contractor.

100 tons, Pasco pumping plant, Columbia Basin project, to Pacific Car & Foundry Co., Seattle.

100 tons, building, Winchester-Olin Co., New Haven, Conn., to Bethlehem Fabricators Inc., Bethlehem, Pa.

Unstated, starch and flour plant, Idaho Potato Growers Inc., Idaho Falls, Idaho, to unstated interest.

STRUCTURAL STEEL PENDING

4200 tons, approaches and bridge superstructure, S. Capital St. bridge, Washington; American Bridge Co., Pittsburgh, low bidder.

2300 tons, ice arena, Cincinnati Gardens Inc., Cincinnati; bids in.

2000 tons, estimated, for a $10 million beer can factory, American Can Co., Hillside, N. J., bids asked.

1100 tons, power plant addition, Western Massachusetts Electric Co., West Springfield, Mass.

1000 tons, warehouse building, First National Stores, Portland, Me.

911 tons, bridge, Sec. 34Z-1F, Danville, Vermilion county, Ill., for State Highway Division; Illinois Steel Bridge Co., Jacksonville, Ill., low; bids Sept. 12.

910 tons, bridge over highway 51, for U. S. Engineer, Tulsa, Okla.; bids Sept. 8.

900 tons, city hall, Lynn, Mass.

600 tons, parts warehouse, General Motors Corp., Philadelphia, bids Sept. 23.

500 tons, factory building, Excelsior Furniture Co., Chicago; Engineering Systems Inc., Chicago, architect.

475 tons, sheet piling, Garrison dam, Riverdale, N. Dak., for U. S. Engineer; Forcum James Co., Dyersburg, Tenn.; H. N. Rogers & Sons, Memphis, and S. K. Jones Construction Co., Memphis, jointly low on general contract.

300 tons, addition to research building, Standard Oil Co. of Indiana; Holabird & Root, Chicago, architects.

300 tons, refinery addition, Gulf Oil Corp., Toledo, O., bids Sept. 30.

300 tons, veterans hospital, Lebanon, Pa., bids Oct. 14.

260 tons, truss bridge, Lewis county; bids to Washington State Highway Dept., Olympia, Sept. 23.

250 tons, New Jersey state highway bridge, Hudson county, bids Oct. 1.

217 tons, state bridge work, Washington county, Pa., bids Oct. 3.

211 tons, bridge, Sec, 58F and 58V-P, Warrenville, DuPage county, Ill., for State Highway Division; Midland Structural Steel Co., Cicero, Ill., low.

200 tons, brew house, Globe Brewery Co., Baltimore, bids Sept. 22.

190 tons, bridge alterations, Reading Railroad; inquiries out.

175 tons, plant addition, Kind & Knox Gelatin Co., Camden, N. J.

142 tons, bridge, Sec. DX-SS, Nilwood, Macoupin county, Ill., for State Highway Division; Bethlehem Steel Co., Bethlehem, Pa., sole bidder.

140 tons, bridge, Sec. 11F, Elkville, Jackson county, Ill., for State Highway Division; Illinois Steel Bridge Co., Jacksonville, Ill., low.

130 tons, box factory, Pottsville, Pa., bids Sept. 22.

115 tons, switchyard excavation, Keswick dam, Redding, Calif., Bureau of reclamation, Denver; bids Sept. 16.

92 tons, plus 526 sq ft of steel beam bridge flooring, 3-inch depth, and 2979 sq ft of 5-inch open type steel beam bridge flooring, Presque Isle state park, Erie county, Pa., bids Oct. 3.

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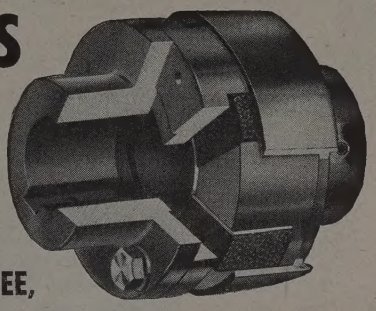

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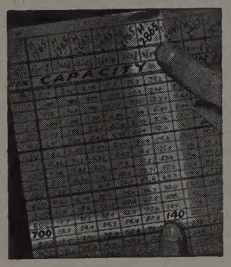

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250 tons, superstructure, mercantile building, Evanston, Ill., for Walter P. Powers, to Joseph T. Ryerson & Son Inc., Chicago; R. C. Wieboldt Co., Chicago, contractor.

126 tons, bridge, Cont. 2811, Vermillion county, Ind., for State Highway Commission, to W. J. Holliday & Co., Indianapolis; Robert H. King, Danville, Ind., contractor.

106 tons, warehouse, Wisconsin Hardware Co., Madison, Wis., to Bethlehem Steel Co., Bethlehem, Pa.; J. H. Findorff & Son, Madison, Wis., contractor.

REINFORCING BARS PENDING

4564 tons, contracts 3 and 4, South Side intercepting sewer, Sanitary District of Chicago; S. A. Healy Co., Chicago, low on general contract; award doubtful because cost well over estimate.

2330 tons, state bridge, substructure work, Penrose Avenue, Philadelphia, bids Oct. 10; also required are 420 tons of structural steel.

1350 tons, medical-dental center, University of Washington, Seattle; first bids rejected; new bids to Board of Regents, revised plans, Sept. 23.

1200 tons, veterans hospital, Lebanon, Pa., bids Oct. 14.

1155 tons, duPont experimental station, Wilmington, Del., bids closed Sept. 12; 2320 tons of shapes also required.

645 tons, track relocation, etc., Lookout Point dam, Lane county, Oreg.; bids to U. S. Engineer, Portland, Oreg., Oct. 9.

610 tons, municipal filtration plant, Hammond, Ind.; bids taken Aug. 29 rejected.

475 tons, river piers, boroughs of Elizabeth and West Elizabeth, Pennsylvania, bids to the State Department of Highways, Harrisburg, Pa., Sept. 19.

387 tons, state road work, near North York borough, Pa., bids Sept. 12.

260 tons, building, Northern Indiana Childrens hospital, South Bend, Ind.; Skidmore, Owings & Merrill, Chicago, architects.

200 tons, paving, Marshall county, Iowa, for state; Atkinson Paving Co., Chillicothe, Mo., low on general contract.

200 tons, municipal sewage disposal plant, Philadelphia; bids Oct. 8.

165 tons, Washington state highway projects; bids in.

122 tons, state bridge and roadway, Washington county, Pa., bids Oct. 3.

100 tons, Washington state highway projects; bids to Olympia Sept. 23.

100 tons or more, Washington state game department building, Seattle, $200,000 project; bids in October.

100 tons or more, Washington state patrol and testing station, Seattle; W. G. Clark, Seattle, low at $445,300.

Unstated, warehouse and plant, Columbia Bag & Metal Co., Portland, Oreg.; contract for first unit to Bingham Construction Co., Portland.

Unstated, $100,000 state highway bridge, Cedar river, Wash.; bids soon.

PLATES . . .

PLATES PLACED

2000 tons, oil storage tanks, Bridgeport, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, 11 storage tanks, Shell Oil Co., Sewaren, N. J., to Graver Tank & Mfg. Co. Inc., East Chicago, Ind.

210 tons, three roof tanks, Shell Oil Co., Girardeau, Mo., to Graver Tank & Mfg. Co. Inc., East Chicago, Ind.

Unstated, 12 miles of steel water supply line, for Cottage Grove, Oreg.; $400,000 project; six additional miles to be built by Army Engineers; pipe contract placed with unnamed Portland, Oreg., concern.

Unstated, reconversion of steamer *Patuxent*, to Everett Shipbuilding & Drydock Co., Everett, Wash., for $331,311; unstated quantity of shapes also involved.

PLATES PENDING

1500 tons, steel penstocks, five 22-ft. diam., welded, Davis dam project, Arizona-Nevada, Bureau of Reclamation, Denver; bids Sept. 26.

Unstated, coffer dam, McNary dam site, Columbia river, Wash.; bids soon to U. S. Engineer, Portland, Oreg.

PIPE . . .

CAST IRON PIPE PENDING

550 tons, 8- and 12-in. class 150, bell and spigot; bids to Board of Public Works, Seattle, Sept. 16.

STEEL PIPE PLACED

Unstated, housing project, Richland, Wash., for Hanford Engineering Works, to unstated interest.

STEEL PIPE PENDING

129 tons, standard steel pipe, including 20,000 ft 2-in., 30,000 ft 2½-in. and 775 ft 5-in., Bureau of Electricity, Department of Streets & Electricity, Chicago; bids Aug. 14, none received.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chicago, Indianapolis & Louisville Railroad, 350 freight cars of which 300 fifty-ton high-side gondolas went to Pullman-Standard Car Mfg. Co., Chicago, and 50 seventy-ton mill-type gondolas went to Pressed Steel Car Co., Inc., Pittsburgh.

Lehigh Valley, 500 hopper cars, to Bethlehem Steel Co., Bethlehem, Pa.

New York City Board of Transportation, 100 subway cars, to American Car & Foundry Co., New York.

Seaboard Air Line, 500 fifty-ton box cars, to Pressed Steel Car Co., Pittsburgh, and 300 seventy-ton hopper cars to Bethlehem Steel Co., Bethlehem, Pa.

Shell Chemical Corp., San Francisco, 36 8000-gal aluminum tank cars, all-welded, to American Car & Foundry Co., New York.

RAILROAD CARS PENDING

Columbia Steel Co., 45 seventy-ton gondola cars, bids asked.

Erie, 1800 freight cars, including 1000 fifty-ton hopper cars, 700 fifty-ton box cars, and 100 seventy-ton covered hopper cars, bids asked.

St. Louis, San Francisco Railway, 1300 freight cars, purchase authorized by directors, specifications expected out shortly.

Wheeling & Lake Erie, purchase of 1000 seventy-ton and 12 covered hopper cars authorized by directors; bids to be asked shortly.

LOCOMOTIVES PLACED

Erie, 11 diesel-electric switch engines, American Locomotive Co., New York, receiving five of 1000-hp, and Electro-Motive Division, General Motors Corp., LaGrange, Ill., five 1000-hp units and one 660-hp unit.

LOCOMOTIVES PENDING

St. Louis, San Francisco Railway, 19 diesel-electric road, freight and switching engines, purchase authorized with inquiry out soon.

RAILS PLACED

Pennsylvania Railroad, 141,000 tons of rails, weighing respectively, 133, 140 and 155 lb to the yard, with 70,500 tons going to Carnegie-Illinois Steel Corp., Pittsburgh, 62,000 tons to Bethlehem Steel Co., Bethlehem Pa., and 8500 tons to Inland Steel Co., Chicago.

RAILS PENDING

Delaware, Lackawanna & Western, 12,000 tons, bids asked.

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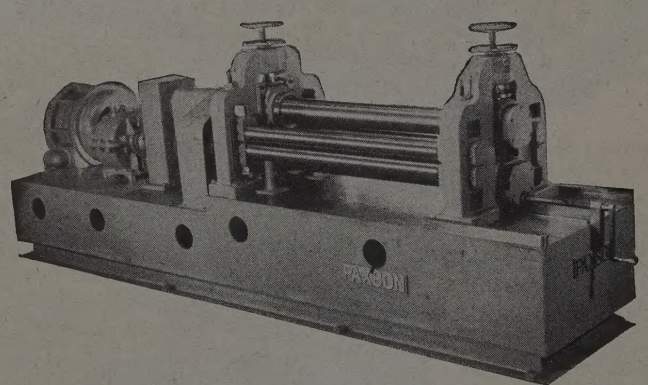

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SALEM, OHIO

CONSTRUCTION AND ENTERPRISE

ALABAMA

SHEFFIELD, ALA.—Electro Metallurgical Co. has let a $250,000 contract to C. G. Kershaw Construction Co., Birmingham, for the erection of a building to house a 10,000 kw electric furnace.

ARKANSAS

ARKANSAS CITY, ARK.—Kanotex Refining Co. has awarded a $375,000 contract to Koch Engineering Co. for modernizing a refinery.

DELAWARE

EDGEMOOR, DEL.—Ethyl Corp., 504 Lexington Ave., New York, has awarded a $600,000 contract to James Stewart & Co., 230 Park Ave., New York, for the construction of a fluid handling plant.

GEORGIA

ATLANTA—Firestone Tire & Rubber Co. has let a $350,000 contract to Thompson & Street, P. O. Box 432, Hapeville, for construction of warehouse and office buildings at 480 Lindbergh Dr.

IDAHO

BLISS, IDAHO—Idaho Power Co. has filed federal and state applications for a proposed $17 million dam and power plant on the Snake river near here.

ILLINOIS

EVANSTON, ILL.—Rustoleum Mfg. Co., 2435 Oakton St., plans to build a $200,000 project to include a 3-story factory and a 1-story warehouse. Architect is W. Fred Dolke, 189 W. Madison St., Chicago.

ST. CHARLES, ILL.—Owens-Illinois Glass Co., Ohio Bldg., Toledo, O., contemplates additions, alterations and improvements to its local plant to approximate $100,000. Architects are Skidmore, Owings & Merrill, 104 S. Michigan Ave., Chicago.

INDIANA

RENSSELAER, IND.—Miniature Train & Railway Co., P. A. Sturtevant, president, Addison, Ill., plans to build a $150,000 factory here.

ROCHESTER, IND.—Sealed Power Inc., c/o E. C. Young, Muskegon, Mich., has awarded a $200,000 contract to Strom & Strom, Muskegon, Mich., for construction of a 1-story factory. Supervising architects are Giffels & Vallett, 1000 Marquette Bldg., Detroit.

IOWA

SIOUX CITY, IOWA—Wilson Trailer Co., 615 Water St., has awarded a $175,000 contract to H. S. Holtze Construction Co., 2121 E. Fourth St., for the erection of a trailer factory. Architect is W. Beuttler, Insurance Exchange Bldg.

KANSAS

KANSAS CITY, KANS. — Phillips Petroleum Co., Bartlesville, Okla., has awarded a $500,000 contract to Winn-Senter Construction Co., Railway Exchange, for the erection of a 2-story plant. Engineer is C. W. Hubbell, c/o owner.

LOUISIANA

MONROE, LA.—Selig Mfg. Co., Leominster, Mass., plans to build a $750,000 furniture manufacturing plant here. Architects are Padgett & Stubbs, Ouachita Bank Bldg.

MICHIGAN

CLAWSON, MICH.—Andrews Mfg. Co., 660 Rochester Rd., has been formed by Alma K. Andrews with a capital of $100,000 to

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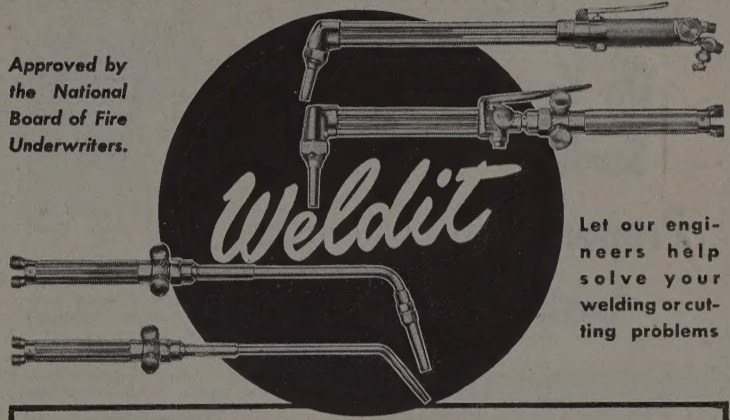

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DETROIT—Dalhart Engineering & Mfg. Co. Inc., 14827 Jefferson, has been formed by Elmer F. Paner with a capital of $100,000 to manufacture tools, welding equipment and dies.

DETROIT—Transit Die & Tool Co., 1264 Meldrum Ave., has been formed by Charles R. Neal with a capital of $50,000 to manufacture tools, dies, jigs and fixtures.

DETROIT—Peco Tool & Mfg. Co., 14335 E. 9-Mile Rd., has been formed by Peter Magyari with a capital of $50,000 to manufacture tools, dies, fixtures and machinery.

DETROIT—Ideal Cabinet Corp., 7722 Joy Rd., has been formed by Everett F. Kirchner, with a capital of $100,000 to manufacture and sell cabinets.

GRAND RAPIDS, MICH.—C. O. Porter Co. will build a $250,000 plant. Plans are by Daverman Co.

HIGHLAND PARK, MICH.—Chrysler Corp. is taking figures for the construction of an addition to its Aplex Division plant. Engineers are Albert Kahn Associated Architects & Engineers, Detroit.

MIDLAND, MICH.—Dow Chemical Co. recently suffered severe damages from fire at its styrene polymerization plant here.

MINNESOTA

MANKATO, Minn.—Minnesota Valley Natural Gas Co., O. M. Hoxie, local manager, has awarded a $200,000 contract to J. F. Pritchard Co., Fidelity Bldg., Kansas City, Mo., for the construction of a plant to include seven storage tanks, pumps, etc., and the laying of about 9000 linear feet of 12-in. connecting lines.

MINNEAPOLIS—Van Dusen-Harrington Co., 718 Grain Exchange Bldg., has awarded a $450,000 contract to Barnett & Record Co., 700 Flour Exchange Bldg., for the construction of a grain dryer.

MISSOURI

SPRINGFIELD, MO.—Missouri Farmers' Association, Dr. Herman Haag, Columbia, director of research, plans construction of a $300,000 fertilizing plant.

ST. LOUIS—Pittsburgh Plate Glass Co., 1106 Central Industrial Dr. has let a $300,000 contract to Woermann Construction Co., 3800 Pine St., for the erection of a 1-story office and warehouse at 3650 Market. Architect is A. Stanley Knorth & Associates, 4875 Easton.

ST. LOUIS—Swift & Co., Chicago, has let a $150,000 contract to W. H. Ruskamp for construction of a 2-story factory addition at 3818 Chouteau.

NEW JERSEY

HILLSIDE, N. J.—American Can Co., 230 Park Ave., New York, has purchased a 46-acre site here for a beer can factory. Cost of land, building and equipment will be an estimated $10 million.

NEW YORK

BUFFALO—E. I. du Pont de Nemours, River Rd., has awarded a $500,000 contract to George W. Walker & Sons, 770 Elmwood Ave., for the construction of a research laboratory.

NEW YORK—Louis Miano, 3556 Holland Ave., has awarded separate contracts totaling $55,000 for the construction of a 1-story factory on Butler Place near Commerce Ave.

NEW YORK—Joseph Nesi, 447 W. 18th St., has awarded a $210,000 contract to George Hoffman & Sons Inc., 349 E. 149th St., for the construction of a factory at Coster and Faile Sts.

OHIO

BELLEVUE, O.—National Farm Machinery Cooperative Inc. has appropriated $500,000 for the erection of a foundry on the factory site here of Ohio Cultivator Division. Facility is scheduled for completion by next July.

CLEVELAND—Coal & Ore Investment Co. has been formed by Carl C. Tucker and associates with authorization to issue 70,000 shares of no par value common stock and $1 million in preferred stock. Firm is to deal in lands containing coal and ore. Statutory agent is Clarence W. Gardner, Leader Bldg.

CLEVELAND—Murray Ohio Mfg. Co., 1115 E. 152nd St., will erect a 1-story factory on 152nd St. Facility will contain about 40,000 sq ft of floor space.

CUYAHOGA FALLS, O.—Ohio Bell Telephone Co., F. P. Elder, district commercial manager, will spend $153,000 improving its telephone facilities here.

LEESVILLE, O.—Muskingum Coal Co. plans to spend approximately $1 million on a coal mine here which is expected to begin production next November or December. Chief engineer of the firm is H. R. Lewis.

LIMA, O.—Standard Oil Co. of Ohio has awarded a contract to Arthur G. McKee Co., 2300 Chester Ave., Cleveland, for construction of a catalytic cracking unit and gas plant here. Project is part of a $10 million modernization program announced last April.

PARMA, O.—General Motors Corp., Chevrolet Motor Co., has awarded a contract to Darin & Armstrong Inc., Detroit, to build the proposed parts plant here.

PORTSMOUTH, O.—Williams Mfg. Co., Sallia and Campbell Aves., proposes to build a $146,000 addition to its shoe factory. Plans are by Hillsmith & Co., 124 E. Third St., Dayton.

SALEM, O.—Mullins Mfg. Co., George E. Whitlock, president, plans to spend $1 million in improving its Salem and Warren, O., plants.

OREGON

PORTLAND, OREG.—Industrial Air Products Co. is constructing a $50,000, Butler-type plant at 6500 NW. Front St. Firm is also completing an oxygen plant at the same address.

SPRINGFIELD, OREG.—Weyerhaeuser Timber Co., Tacoma Bldg., Tacoma, Wash., plans to build a $1 million sulphate plant here.

PENNSYLVANIA

CORAOPOLIS, PA. — Russell, Burdsall & Ward Bolt & Nut Co., Midland Ave., Pt. Chester, N. Y., plans to spend over $500,000 on additional buildings at its plant here.

LANCASTER, PA.—Armstrong Cork Co. plans to build a $500,000 research project to include a research building, laboratories and several pilot plants.

SEWARD, PA.—Pennsylvania Electric Co. will build a $5 million addition to its steam electric generating plant. Engineer is Gilbert Associates Inc., 412 Washington St., Reading.

TENNESSEE

COLUMBIA, TENN.—Monsanto Chemical Co., 1700 S. Second St., St. Louis, has awarded separate contracts totalling $500,000 to enlarge a furnace building, erect service buildings and alter an elemental phosphorus production plant.

TEXAS

DALLAS, TEX.—First Texas Chemical Co., V. M. Payne, president, has let a $150,000 contract to T. C. Bateson Construction Co., 622 Irwin, for construction of a factory at 1810 N. Lamar St. Architect and engineer is H. B. Gieb & Associates, Texas Bank Bldg.

FREEPORT, TEX.—Dow Chemical Co. has awarded contracts totalling $4,400,000 to Tellepsen Construction Co., 3900 Clay St., Houston, for the erection of a chlorine manufacturing plant and setting up machinery.

HOUSTON, TEX.—Technical Instrument Co., 3732 Westheimer Rd., received a low bid of $60,000 for an instrument plant from Brown Construction Co., 5105 Ave. L.

MIDLAND, TEX.—Lone Star Gas Co., 1915 Wood St., Dallas, will spend $250,000 on enlarging its plant.